THE
NAUTILUS

A QUARTERLY JOURNAL
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS

VOL. 56
JULY, 1942 to APRIL, 1943

EDITORS AND PUBLISHERS

HENRY A. PILSBRY
Curator of the Department of Mollusks and Marine Invertebrates,
Academy of Natural Sciences

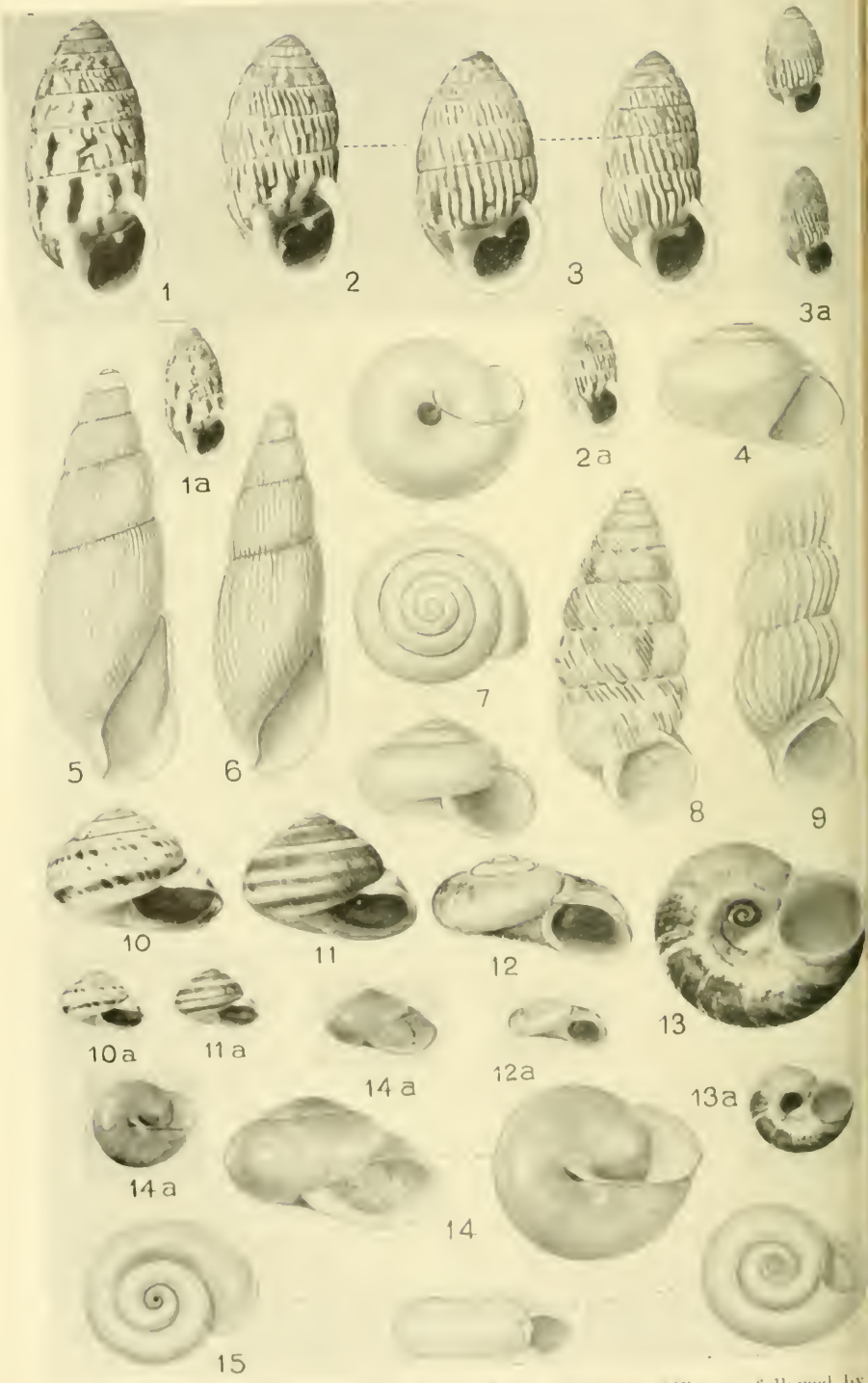
H. BURRINGTON BAKER
Professor of Zoology, University of Pennsylvania
PHILADELPHIA, PA.

LANCASTER, PENNSYLVANIA

CONTENTS

Names of new genera and species in *italics*

INDEX OF AUTHORS



Land and Freshwater Mollusca of the Cayman Islands. (Figures followed by are actual size, the others enlarged.)

THE NAUTILUS

Vol. 56 July, 1942 No. 1

LAND MOLLUSCA OF THE CAYMAN ISLANDS COLLECTED BY THE OXFORD UNIVERSITY BIOLOGICAL EXPEDITION, 1938

By H. A. PILSBRY

The Oxford University Biological Expedition to the Cayman Islands, a party of five under the leadership of Mr. W. G. Alexander, was in the field from April 17 to August 27, 1938. The primary interests of the Expedition were botanical, entomological, herpetological and ichthyological, but nearly every group of animals received some attention. The small collection of mollusks which was casually gathered by Mr. C. B. Lewis is admittedly incomplete and is largely from Grand Cayman, the islands of Little Cayman and Cayman Brac being poorly represented.

The bulk of the collection and the types will be deposited in the British Museum (Natural History); paratypes have been deposited in the Museum of the Academy of Natural Sciences of Philadelphia.

Previous information on the mollusk fauna of Grand Cayman is contained in two papers:

1930. Pilsbry, H. A. Results of the Pinchot South Sea Expedition: I. Land Mollusks of the Caribbean Islands, Grand Cayman, Swan, Old Providence and St. Andrew, Proc. Acad. Nat. Sci. 82: 221–239.

1930. Pilsbry, H. A. *Ibid.*, II, pp. 352, 353.

Reference to former literature may be found in these publications. In the following list the records are for Grand Cayman except where otherwise stated.

The collection on which this report is based has added seven species and two subspecies, and the following genera to the Grand Cayman fauna: *Geomelania, Alcadia, Microceramus* and *Tropicorbis.*

In my first paper of 1930 a list was given on p. 225 to show the affinities of the species with those of other regions. The additions now made do not materially alter the percentages there given. Of the additional forms, exclusive of culture snails:

4 species of 3 genera are purely Jamaican in their affinities (*Poteria, Lacteoluna, Varicella*).

1 species seems nearest a Cuban form, but similar species occur also in Jamaica (*Alcadia*).

5 species in which the closest affinities elsewhere are undetermined (*Cepolis, Geomelania, Microceramus, Tropicorbis,* and *Drepanotrema*). *Cepolis* and *Geomelania* occur in both Cuba and Jamaica, and an anatomic study of Cayman species is needed to show where they belong. The genera *Microceramus, Tropicorbis* and *Drepanotrema* are so widely scattered in the Antilles and mainland that they are not significant in this connection.

CYCLOPHORIDAE

Poteria fonticulus Preston

Bos'un Bay, West Bay area; Boilers, near Georgetown.

Poteria caymanensis Pilsbry

Boilers, near Georgetown (from a deep sink in the "karst" limestone).

Poteria caymanensis oligoptyx, new subspecies. Pl. 1, figs. 12, 12a, 13, 13a.

Battle Hill, eastern end of Grand Cayman about 2 miles inland. (C. B. Lewis, July 3rd, 1938).

The shell is similar to *P. caymanensis* in form and the rather wide umbilicus. The surface of the first whorl is smooth, the rest finely striate axially, and at and above the periphery having some weak, retractive corrugation, obsolete on the last part of the last whorl and locally developed elsewhere.

Height 10.3 mm., diameter 15.3 mm.; 4–1/3 whorls.

Height 8.5 mm., diameter 14 mm.

It differs from *P. caymanensis* only by the weakness of the oblique corrugation, constant in five specimens taken; but as the greater part of the island is still unexplored, it is quite possible that intermediate stages of sculpture may exist. For this reason the subspecific rank has been used. If intermediate stages are not found it will be considered a species.

In a larger shell, height 11.8 mm., diameter 18.3 mm., only a faint trace of corrugation is visible. It is from the eastern seaside settlement known as East End.

Poteria lacvitesta Pilsbry

Branching of Forest Glen Rd. from Further Land Rd., North Side area, about 1½ miles inland from north coast.

Pomatiasidae

Chondropoma parvicaymanense Pilsbry

Pond south of Salt Rocks Hill, west end of Little Cayman.

Chondropoma caymanense Preston

Numerous specimens with typical sculpture were taken on the Newtown Road at Governor's Sound.

A weakly differentiated race was taken at the Savage-English Cisterns, on the north coast. The spiral cords are somewhat narrower and often, but not always, more numerous. It reaches a slightly greater size, length 12.7 mm., with 4½ whorls remaining.

Chondropoma caymanbracense Pilsbry

Halfway across bluff, bush road behind Stakes Bay, Cayman Brae.

Colobostylus rosenbergianus (Preston)

Boilers, near Georgetown.

Colobostylus caymanicola Pilsbry

Battle Hill, Company Land, and Great Beach, localities two to three miles into the interior of the eastern end of Grand Cayman; branching of Forest Glen Road from Further Land Road, North Side area.

Truncatellidae

Geomelania alemon, new species. Plate 1, fig. 9.

Boilers, near Georgetown (C. B. Lewis, August, 1938).

The shell has the usual cylindric shape and deeply constricting sutures of the genus. The whorls are strongly convex, with sculpture of strong axial ribs separated by far wider intervals which are very closely and minutely striate spirally. The last whorl runs free at the end. Aperture broadly ovate, the peristome free, obtuse, its outer and basal margins expanded.

Diameter above aperture 1.1 mm.; length of aperture 0.95 mm.

This is described from specimens which have lost much of the spire, but it should be recognizable by the sculpture. The last four whorls are of equal diameter. It is the only species of this genus known from the Caymans. It is somewhat like *G. lyrata* Poey, of Cuba, but differs from that, as well as from the smaller Jamaican species, by the free aperture and coarser sculpture.

HELICINIDAE

Helicina fasciata substriata Gray

Battle Hill, interior of eastern end of Grand Cayman; branching of Forest Glen Road from Further Land Road, north side area; Newtown Rd., Governor's Sound; English Sound (off Great Sound); Bos'un Bay, West Bay area.

Alcadia lewisi new species. Plate 1, fig. 4.

Halfway across bluff, bush road behind Stakes Bay, Cayman Brac (C. B. Lewis, May 26th, 1938).

The shell is similar in general form to *A. minima* (Orb.). The spire is convexly conic, the apex obtuse, the periphery rounded, base slightly convex. The suture is only lightly impressed. Being dead and bleached, no trace remains of periostracum or color. The half-round aperture is oblique. Peristome is very slightly expanded, very slightly thickened, barely perceptibly excavated at the base, next to the columella. The columellar callus is flat and rather small.

Height 3 mm., diameter 4.5 mm.; 4 whorls.

The very shallow, hardly noticeable notch of the basal lip at foot of the columella, differentiates this species from *A. minima* of Cuba, which it resembles otherwise. It is the first *Alcadia* from the Cayman Islands.

HELMINTHOGLYPTIDAE

Cepolis (*Hemitrochus*) *streatori* Pilsbry

Boilers; Newtown Road, Governor's Sound.

Cepolis (*Hemitrochus*) *lewisiana*, new species. Plate 1, figs. 14, 14a.

Battle Hill, interior of eastern end of Grand Cayman (C. B. Lewis, July 1st, 1938).

The depressed shell is thin, narrowly umbilicate, of a uniform light buff color. The spire is low conic, apex obtuse, the pe-

riphery obtusely angular, base convex. Surface rather glossy, with weak lines of growth. The oblique aperture is wide, white within. Peristome narrow, the outer margin narrowly expanded, the umbilical half of the basal margin reflected, dilated over and covering the greater part of the umbilicus.

Height 8 mm., diameter 14.5 mm.; 4 whorls. Type.

Height 9.7 mm., diameter 15.1 mm.

While this species is evidently closely related to *C. streatori*, it is a thinner, unicolored shell, with the umbilicus decidedly more widely open, and it has about half a turn less.

Cepolis (*Hemitrochus*) *caymanensis* "Maynard" Pilsbry. Plate 1, figs. 10, 10a, 11, 11a.

Cotton Tree Land; west end of Cayman Brac. figs. 10, 10a, represent the type specimen. Figs. 11, 11a, are a shell having the spiral bands continuous, but with some darker streaks.

Sagdidae

Lacteoluna caymanensis Pilsbry

Boilers, near Georgetown; branching of Forest Glen Road from Further Land Road, North Side area; Battle Hill, interior of eastern end. The generic position of species herein referred to *Lacteoluna* is uncertain, as no Cayman specimens have been dissected.

Lacteoluna summa Pilsbry

Ridge north of Savannah Land, eastern end of Grand Cayman.

Lacteoluna cistula, new species. Plate 1, fig. 7.

At branching of Forest Glen Road from Further Land Road, North Side area.

The shell resembles *L. caymanensis* but differs in smaller size, higher spire and larger umbilicus, contained about 5½ times in the diameter. The surface of the dead shell is weathered, so that microscopic sculpture, if present, is not visible.

Height 3 mm., diameter 4.6 mm.

Bulimulidae

Oxystyla undata jamaicensis Pilsbry

3 specimens, taken alive at Georgetown.

Urocoptidae

Brachypodella caymanensis Pilsbry

Newtown Road, at Governor's Sound.

Microceramus caymanensis, new species. Plate 1, fig. 8.

Battle Hill, interior of eastern end of Grand Cayman. Type

from branching of Forest Glen Road from Further Land Road, North Side area.

A species related to *M. concisus* of Guatemala and Yucatan, but differing by its broader shape, the spire with decidedly convex outlines, and the individual whorls more strongly convex. The first 1½ whorls are glossy, with fine, weak axial striation. Subsequent whorls with strong, retractively axial striation; on the spire every second stria terminating in a sutural papilla (or in some specimens these papillae are partly obsolete), the last turn often without papillae. There is a blunt, low keel on the back of the last whorl. The shell is whitish, maculate with pale brown.

Length 8.5 mm., diameter 3.6 mm.; 9 whorls.

This belongs to a group of very similar Microcerami, occurring on the mainland, in Jamaica, Haiti, Cuba and Florida. The Grand Cayman form appears somewhat nearer to the continental *M. concisus* than to the West Indian species.

CERIONIDAE

Cerion martinianum (Küster).

Old Isaacs', eastern end of Grand Cayman.

Lewis writes: "*Cerion martinianum* is abundant along the entire western coast of Grand Cayman, in many places literally covering the vegetation at the top of the long West Bay Beach.

"I searched quite carefully but never found any living examples of the species along the eastern coast. It is very curious, however, that the sand, which extends behind the storm beach some 200 yards to the foot of the abruptly rising Miocene 'bluff,' is strewn with dead shells. The people of these parts all claim that these shells were washed up during the terrible hurricane of 1932. They were strange to the people of the district and as a result many bottles were filled and kept as curiosities."

The form *C. martinianum caymanense* Pilsbry is apparently confined to the north shore, east of the Great Sound. It is weakly differentiated from *C. martinianum* by the usually smaller size and the presence of dark stripes, but the size and color are variable and there seems to be complete intergradation with *martinianum*.

Small examples measure:

Length 16.2 mm., diameter 8.4 mm.

Length 16.5 mm., diameter 6.9 mm.
Length 21 mm., diameter 9.2 mm.

The localities follow: Sand Cay, head of Ford's Creek, off Great Sound (Plate 1, figs. 2, 2a); behind English Cisterns (Plate 1, figs. 1, 1a).

According to Lewis' notes, "On Sand Cay the *Cerion* were almost confined to *Thrinax argentea,* the silver thatch, and were abundant on the under side of the leaves."

Cerion pannosum (Maynard).

Muddyfoot's Point, east end of Little Cayman; also behind South Town.

Cerion pannosum copium (Maynard).

Point at west end of Cayman Brac.

Cerion laevigatum (Maynard).

Behind South Town, at west end of dead mangrove swamp, Little Cayman.

Subulinidae

Subulina octona (Bruguière).

Branching of Forest Glen Road from Further Land Road, North Side area; Georgetown.

Opeas micra (Orbigny).

Newtown Road at Governor's Sound; Boilers, near Georgetown.

Oleacinidae

Varicella caymanensis, new species. Plate 1, fig. 6.

Branching of Forest Glen Road from Further Land Road, North Side area.

The shell is slender, of 6 whorls joined by a moderately impressed suture; the diameter contained slightly more than three times in the length. The whorls are slightly convex, the last approaching a cylindric form. About 1½ whorls are smooth, the rest closely and finely grooved vertically. On the last whorl there is a low varix not far behind the lip (in the type). The aperture is short, broader than in *V. pinchoti,* contained about 2.6 times in the total length. Outer lip is smoothly finished and arches gently forward, receding at the base. The short columella is concave, abruptly truncate at base.

Length 9.8 mm., diameter 3 mm.; length of aperture 3.6 mm.

This snail is at once separable from *V. pinchoti* Pils. by the concave columella. Also the sculpture is finer and closer and the form slimmer. It agrees with *V. pinchoti* in having 1½ smooth apical whorls.

Varicella caymanensis ampla, new subspecies. Plate 1, fig. 5.

Found with the preceding species, and similar to that in sculpture and the concave columella. It is larger and the last whorl is broader than in that species.

Length 10.7 mm., diameter 3.6 mm.; length of aperture 4.6 mm.

This probably represents a separate species, but as only a single specimen was taken, the constancy of its differential characters is uncertain.

SUCCINEIDAE

Succinea latior C. B. Adams.

Newtown Road, Governor's Sound behind Savage-English Cisterns, north coast; branching of Forest Glen Road from Further Land Road, North Side area.

PLANORBIDAE

Tropicorbis havanensis insularum, new subspecies.

Cow well, Further Land Road, North Side area, Grand Cayman. (C. B. Lewis, July 17th, 1938).

A miniature of *T. havanensis* (Pfr.), the left side sunken in the middle, the right side narrowly umbilicate there; periphery equably rounded. Aperture strongly oblique, the lip thin. Height 1.4 mm., diameter 4.3 mm.; 4¼ whorls.

These small planorbs may represent a dwarf ecologic form rather than a true subspecies, but as it has been found only in a single place, it seems simpler to give it a varietal name. The specimens are evidently adult from the deflection of the last whorl at the aperture. They have much the general appearance of *Gyraulus.*

It may be mentioned here that the species I recorded as "*Planorbis* aff. *lanierianus* Orb." (1930, Proc. Acad. Nat. Sci. Phila., 82: 239), is an immature specimen of *Drepanotrema lucidum* (Pfr.), of which *P. lanierianus* Orb. is a synonym.

The two freshwater shells of Grand Cayman belong to widely spread groups. *Drepanotrema lucidum* occurs in several West

Indian islands and on the mainland. *Tropicorbis havanensis* is a Cuban species, but scarcely distinguishable forms occur in Jamaica and elsewhere. The small Cayman form described above has not been found elsewhere, so far as our collections show.

EXPLANATION OF PLATE

Figs. 1, 1a. *Cerion martinianum* form *caymanense* Pils., actual size and × 2. Behind English cisterns.

Figs. 2, 2a, 3, 3a. *Cerion martinianum* form *caymanense* Pils., actual size and × 2. Sand Key.

Fig. 4 *Alcadia lewisi*, n. sp., face of type.

Fig. 5. *Varicella caymanensis ampla*, n. subsp. Type.

Fig. 6. *Varicella caymanensis*, n. sp. Type.

Fig. 7. *Lacteoluna cystula*, n. sp. Type.

Fig. 8. *Microceramus caymanensis*, n. sp. Type.

Fig. 9. *Geomelania alemon*, n. sp. Type (spire broken).

Figs. 10, 10a. *Cepolis caymanensis* Pils. Type, actual size and enlarged.

Figs. 11, 11a. *Cepolis caymanensis* Pils. Cotton Tree Land, Cayman Brac.

Figs. 12, 12a, 13, 13a. *Poteria caymanensis oligoptyx*, n. subsp. Type and paratype, actual size and enlarged.

Figs. 14, 14a. *Cepolis lewisiana*, n. sp., actual size and enlarged.

Fig. 15. *Tropicorbis havanensis insularum*, n. subsp. Type, enlarged.

SOME DEEP-SEA PHILIPPINE VOLUTIDS*

BY PAUL BARTSCH

Curator, Divisions of Mollusks and Cenozoic Invertebrates
United States National Museum

On April 21, 1915, a banquet to Dr. William Healey Dall commemorating the completion of fifty years of service to science, 1865–1915, was tendered him at the Cosmos Club of Washington by more than 100 associates and friends. At this gathering the following toasts were delivered:

Dall the Alaska Pioneer ..... Dr. Alfred H. Brooks
Dall the Anthropologist ..... Prof. Wm. H. Holmes
Dall the Coast Pilot ..... Mr. Isaac Winston
Dall the Malacologist ..... Dr. Henry A. Pilsbry
Dall the Paleontologist ..... Dr. T. Wayland Vaughan
Dall the Zoologist ..... Dr. C. Hart Merriam
Dall the Nomenclatorist ..... Dr. Ch. Wardell Stiles

* Published by permission of the Secretary of the Smithsonian Institution.

Dall the Poet ..... Justice Wendell P. Stafford
Dall the Man ..... General A. W. Greely

On this occasion a 20-page brochure was distributed which, in addition to giving a portrait of Dr. Dall and a page of vitae and a menu, devoted an illustrated page to each toast delivered.

On the plate dealing with "Dall the Malacologist," I figured "*Prodallia dalli* Bartsch," a volutid mollusk dredged by us on the *Albatross* cruise in the profound waters of the Philippines.

I have been remiss in not following this publication with a detailed description, which is done herewith. I am here also describing three other species of this genus obtained on the same cruise.

Genus PRODALLIA Bartsch

1915. *Prodallia* Bartsch, Banquet Brochure for William Healey Dall, p. 10.

Large, very elongate-turreted, volutid mollusks marked by protractively curved axial ribs and fine, closely spaced, spiral lirations. The columella bears 2 oblique folds which are not visible in the aperture, but are confined to the earlier turns. The operculum is of semi-lunid outline, corneus, and mark d by numerous, slender, overlapping, horny lamellae which radiate from the nucleus and are bent almost at right angles near the edge. Type: *Prodallia dalli* Bartsch.

Prodallia dalli Bartsch. Plate 2, figs. 1, 4.

1915. *Prodallia dalli* Bartsch, Banquet Brochure for William Healey Dall, p. 10.

Shell large, elongate-turreted, covered with a brownish olivaceous, shining periostracum which pales to olivaceous gray on the anterior half of the last whorl. Nuclear whorls decollated in both our specimens. The postnuclear whorls are rather high between the summit and the suture, well rounded and crossed by very regular and regularly spaced, somewhat sinuous axial ribs which are about as wide as the spaces that separate them, and which terminate at the summit as cusps. Of these ribs 36 are present on the antepenultimate turn. Anterior to this turn the ribs gradually become less strong and are quite enfeebled on the last whorl. In addition to this, the whorls are marked by closely spaced, fine, spiral lirations. Suture deeply broadly channeled. Periphery well rounded. Base long, concave on the left margin and produced into a slender columella. Aperture irregularly oval, channeled anteriorly; outer lip expanded and somewhat

Figs. 1, 4. Prodallia dalli. 2. Prodallia barthelowi. 3. Prodallia johnsoni. 5. Prodallia smithi.

reflected and slightly notched anteriorly; inner lip reflected over the columella and parietal wall as a moderately thick callus. Interior of aperture livid purplish, paler at the edge.

The type, U.S.N.M. No. 231758, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at Station 5119 off Cape Santiago, Luzon, in 394 fathoms, on green mud and sand bottom; bottom temperature, 43.7°. It has 11.5 whorls remaining and measures: Height, 151 mm.; greater diameter, 51.5 mm.; length of aperture, 66.5 mm.

A second specimen, U.S.N.M. No. 231759, was dredged by the *Albatross* at Station 5284 off Lubang Island in 422 fathoms, on gray mud and globigerina bottom; bottom temperature, 43°.

PRODALLIA SMITHI, new species. Plate 2, fig. 5.

Shell elongate-turreted, covered by a thin, light drab, somewhat shining periostracum. Nuclear whorls decollated in all our specimens. The postnuclear whorls are high between the summit and the suture, well rounded and very slightly shouldered at the summit, all but the last whorl crossed by rather strong, sinuous, retractively curved, axial ribs which are about as wide as the spaces that separate them. Of these ribs 21 are present on the antepenultimate turn. These ribs become slightly cusped at the summit. Suture moderately impressed. In addition to the axial ribs, the whorls are marked by fine, closely spaced, spiral striations. Periphery well rounded. Base concave on the left side, drawn out into a long slender columella. Aperture irregularly ovate, channeled anteriorly with a notch posterior to the anterior termination of the outer lip. Interior of aperture pale brown, a little paler at the edge. The columella does not show any folds within the aperture. There is a feeble indication of two folds in the early turns.

The type, U.S.N.M. No. 231760, was dredged by the U. S. Bureau of Fisheries Steamer *Albatross* at Station 5528 off Balicasag Island, Bohol, in 439 fathoms, in globigerina ooze bottom; bottom temperature 53.3°. It has 7.3 whorls remaining and measures: Height, 134 mm.; greater diameter, 42.7 mm.; length of aperture, 65.9 mm. A young specimen of 10 whorls with probably the first missing, was dredged at the same station.

Another specimen, U.S.N.M. No. 235394, was dredged by the *Albatross* at Station 5124 on Maestre de Campo Island, in 281 fathoms on soft green mud bottom.

I take pleasure in naming this for the late Dr. Hugh M. Smith, Director of the Philippine Albatross Expedition.

Prodallia johnsoni, new species. Plate 2, fig. 3.

Shell elongate-turreted, covered by a thin isabelline-colored, somewhat shining periostracum. Nuclear whorls decollated. The postnuclear whorls are rather high between the summit and suture, with the summit narrowly shouldered. The whorls are crossed by somewhat sinuous, rather closely spaced, strong axial ribs which terminate at the periphery of the last turn. Of these ribs 43 are present on the antepenultimate turn. These ribs are a little wider than the spaces that separate them and form cusps at the summit. The whorls are crossed by well incised, moderately strong, and quite regularly spaced, lines on the early turns; on the last 2 the spiral sculpture is reduced to mere fine spiral lirations. Suture moderately deeply narrowly channeled. Periphery well rounded. Base concave on the left side and produced into a long narrow columella. Aperture irregularly oval. channeled anteriorly; outer lip thin, slightly notched near the anterior margin. Interior of aperture of about the same color as the exterior. The columella shows an indication of 2 weak folds deep within. These are more intensified on the preceding turns.

The type, a not quite mature specimen, U.S.N.M. No. 238419, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at Station 5424, off Cagayan Island, Jolo Sea, in 340 fathoms on coral sand bottom; bottom temperature, 50.4°. It has 12.5 whorls remaining and measures: Height, 104 mm.; greater diameter, 26 mm.; length of aperture, 44.5 mm.

This species most nearly resembles *P. smithi*. It differs from this in being much more slender and in having a more strongly channeled suture and the axial ribs much finer and more closely spaced.

I take pleasure in naming this for Rear Admiral Marbury Johnson, who was our Skipper during the first half of the Albatross expedition in the Philippines.

Prodallia barthelowi, new species. Plate 2, fig. 2.

Shell small, elongate-conic, covered with a thin isabelline-colored periostracum. The nucleus consists of a little more than one smooth turn which is not larger than the succeeding turn. The posterior whorls are appressed at the summit, all but the last and a fourth of the preceding turn crossed by strong broad axial

ribs which are much wider than the spaces that separate them. Of these there are 15 on the antepenultimate turn. On the last portion of the next to the last whorl the ribs begin to disappear, and on the last turn they are quite obsolete. In addition to this, the whorls are marked by microscopic spiral striations. Suture moderately impressed. Periphery well rounded. Base concave on the left side, produced into a slightly twisted columella, which shows two folds deep within. Aperture irregularly elongate-ovate, channeled anteriorly; outer lip thin with a slight notch near the anterior termination. The columella and parietal wall are covered with a thin callus.

The type, U.S.N.M. No. 238444, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at Station 5425, off Cagayan Island, Jolo Sea, in 495 fathoms, on gray mud and coral sand bottom; bottom temperature, 49.4°. It has 9 whorls and measures: Height, 27.3 mm.; greater diameter, 8.3 mm.; length of aperture, 5.8 mm.

This species differs from *P. johnsoni* in being much smaller and in having the axial ribs disappear completely on the last whorl.

I take pleasure in naming this for our Navigating Officer, Benjamin Barthelow.

SOME NEW AND INTERESTING MARINE SHELLS FROM NORTHWEST FLORIDA

By JEANNE S. SCHWENGEL and THOMAS L. McGINTY

In October, 1941, one of us (McGinty) did extensive dredging off the coast of Florida, around and near Destin, Okaloosa County, and had the good fortune to bring in a great many rare and beautiful shells, including *Aurinia junonia, Murex cabrittii, Conus sozoni, Glycymeris americana, Chione latilirata, Eucrassatella gibbsii,* and many others, although it was the abundance of small species, many of them new to science, which made the dredging most interesting.

The dredging possibilities in this part of the Gulf of Mexico were first brought to the attention of Mr. McGinty by Dr. J. H. Beal, an ardent shell collector, who for many years has maintained a summer residence at Ft. Walton, near Destin, and some forty miles east of Pensacola. Most of the material was taken from two localities. One, about six miles east of Destin, four miles off

shore, over a rocky coral reef in fourteen fathoms of water; and the other about eighteen miles off shore, south by west of Destin, over a sandy marl bottom at a depth of eighteen to twenty fathoms. Much of the success of this dredging was due to the wide knowledge of bottom conditions and expert boat handling of Captain Edwin Marler of Destin, whose skill made it possible to haul two dredges simultaneously.

All of the tremendous task of dredging, cleaning, sorting and early identifying has been done by Mr. McGinty, while specimens of uncertain identity have been sent to Mrs. Schwengel at the Academy of Natural Sciences, where she has completed the identification, with the assistance and supervision of Dr. H. A. Pilsbry, who kindly and generously disclaims any authorship honors.

It is therefore with pleasure that we present the following new shells under joint authorship. We hope to continue this pleasant combination of efforts; Mr. McGinty, with his opportunities for field work, his fine knowledge of genera and species, and his tireless energy and patience in collecting the shells; Mrs. Schwengel, with her privilege of association with Dr. Pilsbry, her access to the wonderful collection and excellent library of the Academy, to help in the identifying of known, but rare specimens, and in describing the new species.

The types of course, will stay with the Academy, but a collection of this material is on display at the Beal-Maltbie Shell Museum, Rollins College, Winter Park, Florida.

Calliostoma (Eutrochius) faustum, n. sp.

Shell umbilicate, high-conic, ochraceous-buff, with unevenly spaced white spots on the peripheral ridge; of eight and a half whorls. The nucleus of one and a half white, rounded whorls; the next three whorls with three, four and six beaded spirals, respectively, which gradually flatten out into bands on the next four whorls, the bands separated by shallow grooves up to the penult whorl, but on the last whorl these grooves are represented by five reddish lines. The groove above the peripheral spotted band more deeply cut, with a moderately defined suture. There is an axial sculpture of faint, uneven incremental lines. The base is flat, with twelve flattened spiral bands, the two or three near the pillar becoming increasingly noduled by converging radial impressions. Umbilicus white and smooth within, bordered by a nodulous cord, narrow and deeply funnelled. Aperture trape-

zoidal, outer lip thin. Pillar perpendicular, slightly sigmoid, ending at base with a small tooth. Height 8 mm., diameter 7 mm.

Dredged in eighty fathoms off Lake Worth, Florida, by T. L. McGinty. Type 178635 A.N.S.P.

This very rare CALLIOSTOMA appears to stand near the unfigured *C. hendersoni* Dall (Proc. U. S. Nat. Mus. 70, Art. 19, p. 7), from 118 fathoms off the Sambo Reefs, Florida. That is much larger and has seven or eight subequal beaded spirals on the last whorl, ten flattened spirals on the base. In sculpture our species compares vaguely with *C. zizyphinum* L. from the Mediterranean.

CALLIOSTOMA FASCINANS, n. sp.

Shell imperforate, high-conic, white with pecan-brown maculations over shell, and a series of orange-cinnamon spots on every third or fourth nodule on the periphery. The texture of the entire shell is so thin that the iridescent nacre of the inner lining shows through. About eight whorls, the first smooth and rounded, the second whorl sculptured with two heavily beaded spirals, the third whorl with three spirals and the fourth, fifth, sixth, seventh and eighth whorls with four each of the beaded spirals. The second and third spirals are much more heavily beaded than the others, and low ribs connect them vertically in pairs, the third spiral forming the over-hanging periphery, the fourth spiral dropping back abruptly to the suture, which is barely discernable. On the last two whorls there is a smooth spiral thread just below the first noduled spiral. The periphery of the last whorl gives a crenulated aspect to the base of the shell, though the fourth spiral really forms the rim of the base, which is barely convex, with eight evenly spaced, lightly beaded spirals, and further sculptured with fine radial curving threads. Pillar lip perpendicular, slightly concave, callus thin, white, the spiral ribs of the base showing through it. Aperture trapezoidal. Height 11.6 mm., diameter 6.6 mm.

Dredged off Lake Worth, Florida, in about 400 feet, by T. L. McGinty. Type 178634 A.N.S.P.

This beautiful little *Calliostoma* might be compared with *C. velici* Pilsbry, though it is much more narrow at the base, more heavily beaded, with fewer spirals and much thinner texture. This species and the preceding will be figured in next NAUTILUS.

DOUGLASSIA BEALIANA, n. sp. Plate 4, fig. 2.

Shell elongate-conic, pecan-brown, of about nine whorls. The

three nuclear whorls are smooth and convex. Slender axial riblets begin on the first post-nuclear whorl, the riblets and spaces between about equal, but the spaces widen considerably with each succeeding whorl. There are twelve ribs on the 1st, ten on the 2nd, 3rd and 4th whorl, and twelve again on the 6th or body whorl. The ribs are sigmoid in form, beginning low at the well-defined suture, grow heavier, almost forming a nodule at the slightly angled periphery, protractively slanting toward the next lower suture, except on the body whorl, where they evanesce, giving place to eight to ten weak spiral threads on the base. There is a broad, whitish band around the periphery of the 4th, 5th and 6th whorls, with a slightly darker, narrow brown band immediately above the white band. Aperture about one-third the length of the shell, oval, with a deep anal sinus posteriorly, and a feeble stromboid notch anteriorly. The inner lip forms a reflected callus over the columella and extends over the parietal wall, projecting into the aperture at the deep posterior sinus as a heavy rounded knob. There is a moderately heavy varix about one-sixth of a turn behind the edge of the outer lip. Length 7 mm., width 2.7 mm.

Dredged by T. L. McGinty in fourteen fathoms off Destin, Northwest Florida. Type 178702 A.N.S.P.

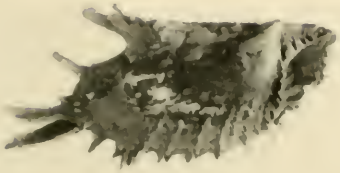
This shell very much resembles *Douglassia enae* Bartsch, but is much smaller and darker, has a slightly larger nucleus, ribs are sinuous, continue over the sinal band, and it has no spiral sculpture except at the base. In all other respects it is apparently very similar.

Trivia maltbiana, n. sp. Plate 4, fig. d.

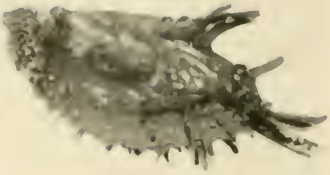
Shell rotundly ovate, right side definitely margined, a little produced right posteriorly, transversely very closely ribbed throughout, interstices faintly granular, ribs weakly continuous across shallow dorsal sulcus. Vinaceous pink, with a large, pale pink blotch in center of back. Aperture narrow, moderately straight except at posterior end where it is recurved, right lip finely toothed and slightly wider at center, lip edge and both posterior and anterior canal pale pink. About 30 ribs on outer lip, of which 9 do not extend to the dorsal sulcus. About 24 ribs on body whorl, all but 3 or 4 continuous, but these few broken and overlapping. Length 13 mm., breadth 10 mm., height 8 mm.

Dredged in 14 fms. off Destin, Northwest Florida, by T. L. McGinty. Type 178703.

This beautiful *Trivia* differs considerably from others known



1



1a

2

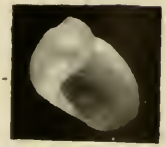
3

4

5

6

7



8

9

Figs. 1, 1a, Pteria xanthia Schwengel. 2, Douglassia bealiana Schwengel & McGinty. 3, Cyclostrema pontogenes S. & M. 4, Phos adelus Schw. 5, Aclis hypergonia S. & M. 6, 7, Tritiaria virginiae Schw. 8, Lamellaria leucosphaera Schw. 9, Marsenina globosa Perry.

from Florida. *T. suffusa* Gray is much smaller, more rotund, has granular ribs and is sprinkled with brown dots. *T. pediculus* L. is about the same size and shape, but brown in color with ribs nodular or crenulated, and four black spots toward the dorsal sulcus.

ACLIS HYPERGONIA, n. sp. Plate 3, fig. 5.

The shell is rimate, slender, the diameter contained about 2.6 times in the length; translucent white; glossy; thin; of about 7½ whorls. The first 2½ whorls are rather strongly convex; all following whorls are strongly carinate at the shoulder, the surface below the carina moderately convex, contracting to the suture. The first 2 ± carinate whorls have two spiral ridges below the carina, but these disappear on the last 2 or 3 whorls. Last whorl rounded below the keel, somewhat tapering at the base. The aperture is oval, angular above, somewhat produced basally; the columellar margin is reflected partly over the narrow umbilicus. Length 3.25 mm., diameter 1.25 mm.

Dredged off Lantana, Florida, in 550 feet. Type 178704 A.N.S.P., others in the Schwengel and McGinty collections.

The strong carination of the shoulder at once separates this *Aclis* from others of the region. *A. bermudensis* Dall & Bartsch, 1911 (Proc. U.S.N.M. 40: 278) is of stouter figure, with only some of the early whorls shouldered, while in our species the keel extends upon the last whorl. The spiral cords or ridges below the shoulder are variable, appearing distinctly on from 1 to 2½ whorls, and in some individuals they are very weak. There is sometimes a small spiral cord above the shoulder carina. Lines of growth are scarcely visible. The name refers to the whorls being angular above.

CYCLOSTREMA (AOROTREMA) PONTOGENES, n. subg. et sp. Pl. 3, fig. 3.

The openly umbilicate, white shell is strongly bicarinate with flattened spire, of 3¼ whorls, the first two planorboid. The first 1½ whorls are smooth, convex, the convexity increasing on the next whorl, and overhanging outwardly on the last whorl, forming a strong but blunt upper carina. There is a more extended and somewhat up-curved carina at the periphery, a deep concavity between the two carinae. Below the peripheral keel the surface slopes straightly to the prominent ridge around the umbilicus.

On the last $1\frac{1}{3}$ whorls there is a secondary sculpture of fine low spiral threads, their intervals crossed by finer growth lines, giving a minutely punctate appearance in some places; these spirals not extending into the funnel-shaped umbilicus. Aperture with the columellar margin deeply concave in the middle. Outer lip inserted just below the keel of next-to-last whorl, gently sloping to the first carina, then concave to the stronger and more extended peripheral carina, below which it slants straightly to the base. Height 1.3 mm., diameter 1.9 mm.

Dredged in 18 to 20 fathoms, off Destin, Northwest Florida, by T. L. McGinty. Type 178697 A.N.S.P.

This species is similar in size, sculpture and form to *C. cistronium* Dall, but the spire is flatter, second carina much more extended in a "pie-crust" manner, the last whorl not descending and the aperture more angled and not separated from the body-whorl as in *C. cistronium.*

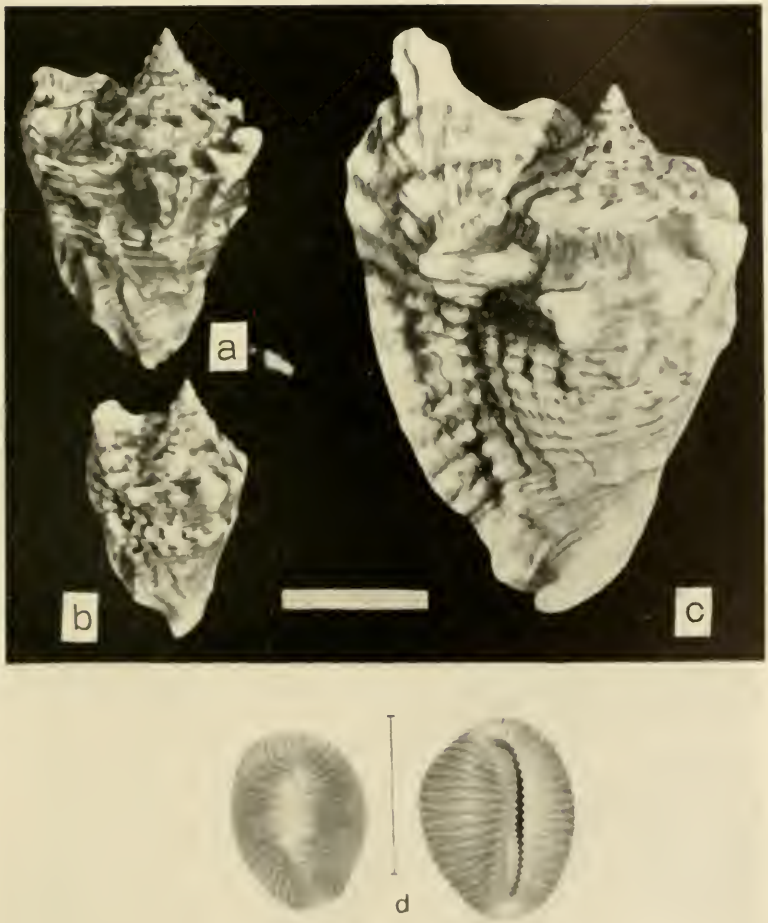
A NEW SUBSPECIES OF *STROMBUS RANINUS* GMELIN

By B. R. BALES, M.D.

For many years, malacologists who have had occasion to collect at the southern end of Lake Worth, Palm Beach County, Florida, have observed that a large proportion of *Strombus raninus* Gmelin (formerly known as *Strombus bituberculatus* Lamarck) in this region were very much smaller than those taken at other stations in Florida.

A series taken in April 1936 and another in April 1942 seem to indicate that the dwarf form is constant and has sufficient other differences from the true *S. raninus* as to constitute a valid subspecies. There are several points of difference: (1) The Lake Worth shells average decidedly smaller. (2) The tip of the lip never extends beyond the apex or spire. (3) A series demonstrates a very much darker coloration. (4) The grain of the shell substance is much finer; many specimens are so glossy that they appear to be oiled, while normal individuals are much duller in surface texture.

Measurements of 93 normal specimens from Key West, Stock Island, Boca Chica Key and East Sister's Key, all located among



Figs. a, b, Strombus raninus nanus. c, Strombus raninus. Scale mark = 1 inch. d, Trivia maltbiana. Scale line = 10 mm.

the Florida Keys, give an average measurement of 79 mm., with the longest specimen measuring 97 mm. in length and the shortest, 57 mm. These measurements are from the base or aperture to the apex. The sex of these was not determined. A series of 248 of the dwarf subspecies gives the following measurements:

Number of males examined, 116. Longest shell (from base to tip) 65 mm. Shortest shell, 38 mm. (One in the McGinty collection measures 36.7 mm.) Average of 116 shells, 50 mm.

Number of females examined, 132. Longest shell, 67 mm. Shortest shell, 51 mm. Average of 132 shells, 60 mm. All measurements are of fully mature adults.

In one hundred per cent of the dwarf subspecies, the lip is shorter than the spire with the exeeption of three individuals, where they are of equal length. Of the 93 shells of normal *S. raninus* Gmel., 81 specimens or 87½ % have the lip of the shell noticeably longer than the tip of the spire, while 12 individuals or 12½ % have the tips shorter or of equal length. In view of the above facts it seems reasonable to give this dwarf, subspecific rank as

STROMBUS RANINUS NANUS, new subspecies. Plate 4, figs. a, b.

Description as of *Strombus raninus* Gmelin (or *S. bitubereulatus* Lamarck) with the following differences:—it is (1) Definitely smaller. (2) Tip of lip *never* extends above apex of shell. (3) Average coloration darker. (4) Texture much finer and often very glossy.

Type and Paratype No. 178696 in the Academy of Natural Sciences. Paratypes in the Museum of Comparative Zoology, in the Bales, McGinty and Koto collections.

Type locality: Southern end of Lake Worth, Palm Beach County, Florida.

It is evident that the measurements of the small specimen of *S. raninus* mentioned on p. 3 of Clench's monograph of *Strombus* in Johnsonia are those of this subspecies.

Since this *Strombus* has always been known among conchologists as the "dwarf from Lake Worth," it has been given the name of *nanus, i.e.*, dwarf.

RANDOM NOTES ON AMERICAN POTAMIDIDAE

By J. BEQUAERT
Museum of Comparative Zoölogy, Cambridge, Massachusetts

While preparing a revision of the Western Atlantic Potamididae for "Johnsonia" some matters of synonymy and nomenclature had to be considered which could not properly be discussed there. Yet the conclusions reached seem sufficiently interesting to warrant publication.

1. The genotype of *Cerithidea* Swainson, 1840, Treatise of Malacology, pp. 198, 203 and 342. On p. 342, Swainson mentioned two species: *C. lineolata* Griff. Cuv. 14. f. 4; and *C. fragilis*. Ib. 32. f. 12. One of these must be the genotype. So far as I can trace, the first valid type designation is by Pilsbry and Harbison (1933, Proc. Acad. Nat. Sci. Phila., 85, p. 115), who state that a new species of *Cerithidea* they describe has a character "not possessed by the genotype, *C. obtusa* (Lam.)." Swainson's first species, *Melania lineolata* Griffith and Pidgeon (1834, Cuvier's Animal Kingdom, 12, Pl. 14 of Moll., fig. 4) is, from the excellent figure, unquestionably identical with *Cerithium obtusum* Lamarck (1822, Hist. Nat. An. sans Vert., 7, p. 71). This *M. lineolata* was renamed *Cerithium truncatum* by Griffith and Pidgeon in their Index (pp. 596 and 598), because of the earlier *Melania lineolata* (Gray) (*Strombus lineolatus* Gray, 1828), shown on Pl. 13, fig. 4 of the same work.

J. E. Gray in 1847 (Proc. Zool. Soc. London, p. 154) gave as first choice for the type of *Cerithidea, Murex decollatus* Linnaeus (1767), and as second choice, *Strombiformis costatus* da Costa (1778); but neither of these species was originally included by Swainson. For a similar reason, Kobelt's designation of "*Cer. decollatum* L." (1888, Syst. Conch. Cab., 1, Abt. 26, p. 4) is also invalid. Wenz (1940, Handbuch d. Paläozool., Gastropoda, Bd. 6, pt. 6, p. 742) cites as type, on the authority of Makiyama, "*C. lineolata* Griffith and Pidgeon [*Melania*] = *decollata* (Linné) [*Murex*]." This is erroneous on two scores. First, Griffith and Pidgeon's *Melania lineolata* (of Pl. 14, fig. 4) is not the East African *Cerithidea decollata*, but the Indo-Malayan *C. obtusa*. Secondly, Makiyama (1936, Mem. Coll. Sci. Kyoto Imp. Univ.,

ser. B, 11, No. 4, p. 221) selected *Melania lineolata* Griffith and Pidgeon, 1834, as type; but he did not decide what it was, merely noting that it seemed "not very different from *Cerithidea decollata* (Linné, 1767)."

Swainson's second species, *Cerithium fragile* Deshayes (1833), is a fossil shell of the genus *Potamides.*

2. I recognize only three species of *Cerithidea* now living in the Western Atlantic: *C. costata* (da Costa, 1778), *C. pliculosa* (Menke, 1829), and *C. scalariformis* (Say, 1825).

Cerithidea insulaemaris Pilsbry and Harbison (1933) is known only from the Miocene of New Jersey. I am unable to understand why Wenz (1940, *op. cit.,* p. 742) cites it as from the Miocene to ? Recent; and quotes it as "Rezent" under the figure which he copied from the original. Moreover, it was taken from a well, not near the locality "Well." No Potamididae have been found alive on the Atlantic coast of America north of South Carolina.

3. The following names I regard as synonyms of *Cerithidea costata* (da Costa), in its typical form, that is with smooth or almost smooth longitudinal ribs: *Strombiformis costatus* da Costa (1778); *Cerithium lafondii* Michaud (1829); *Cerithium ambiguum* C. B. Adams (1845) (cotypes of Adams' species have smooth ribs and his description does not mention that they are nodulose); *Cerithium salmacidum* Morelet (1849) (cotypes seen); *Cerithium petitii* Schramm (1869) (*nomen nudum;* validated by Tryon, 1887, as a synonym of *C. costata*); and *Cerithidea pupoidea* Mörch (1876).

Cerithidea costata turrita Stearns. *Cerithidea turrita* Stearns (1872), is at most a race of *C. costata,* peculiar to the west coast of Florida. It is on the average smaller and more slender than typical *costata.*

Cerithidea costata beattyi J. Bequaert (1942) was proposed for the form of *C. costata* with more or less nodulose ribs figured by Reeve (1866) as *C. ambigua* (not *Cerithium ambiguum* C. B. Adams, 1845). The type locality is St. Croix, Virgin Islands; but it is also known from the Bahamas, Barbuda and Trinidad.

4. *Cerithidea minnor* Mörch (1876, Malak. Blätt., 23, p. 92; Cuba) is the only published name, based on a Western Atlantic

potamidid, which I am unable to recognize. The description fits a variant of *C. costata;* but the measurements are unlike any adult I have ever seen of that species: "Long. 1¼ mm.; lat. 2½ mm." From the unusual disproportion between length and width, I suspect that the length given is a misprint. Perhaps the type is still in existence and may settle the matter.

5. *Cerithidea pliculosa* (Menke) is the earliest valid name for the species usually called *C. iostoma.* Mörch (1876) saw the type of *Cerithium pliculosum* Menke (1829) at the Copenhagen Museum and he included it among his West Indian varicose *Cerithidea* ("T varicigera, labro inerassato"), all of which I regard as one and the same species. The following names I regard as synonyms of *Cerithidea pliculosa: Potamides iostomus* Pfeiffer (1839) and *Cerithium lavalleanum* d'Orbigny (1842). On the other hand, *Cerithium varicosum* Valenciennes (1832), *Cerithium varicosum* Sowerby (1834), *Cerithidea aguayoi* Clench (1934), *Cerithium fortiusculum* Bayle (1880), *Cerithium hanleyi* Sowerby (1855), *Cerithium lafondii* Michaud (1829), and *Cerithium hegewischii* Philippi (1848) were based on different species. *C. lafondii* I synonymize with *Cerithidea costata,* after a careful study of Michaud's original figure, as well as that by Kiener (1841–42). The remaining names do not refer to Western Atlantic shells (see below).

C. pliculosa veracruzensis J. Bequaert (1942) was proposed for the Mexican and Central American form in which the spiral ridges are at least as pronounced as the vertical ribs, producing a cancellate surface. The type locality is Vera Cruz, Mexico. I have also seen it from British Honduras, Guatemala and Nicaragua.

6. The following names are synonyms of *Cerithidea scalariformis* (Say): *Pirena scalariformis* Say (1825), *Potamides tenuis* Pfeiffer (1839), and *Cerithidea hanleyana* Reeve (1866).

7. All *Batillaria* of the Western Atlantic belong to one species, *Batillaria minima* (Gmelin), the following published names referring to individual variants in color or sculpture of the typical form: *Murex minimus* Gmelin (1790), *Cerithium clathratum* "Menke" (1828, *nomen nudum*) Mörch (1876), *Cerithium nigrescens* Menke (1828), *Cerithium septemstriatum* Say (1832),

Cerithium heteroclytes Potiez and Michaud (1838) (not of Lamarck, 1822), *Cerithium peloritanum* Kiener (1841–1842) (not of Cantraine, 1835), *Cerithium eriense* "Valenciennes" Kiener (1841–1842),[1] *Cerithium albovittatum* C. B. Adams (1850), and *Cerithium albocoopertum* C. A. Davis (1904). Some colonies are only of one type, but others are a mixture of several variants, with all transitions. None of these variants are geographically or ecologically segregated; hence they do not, in my opinion, deserve to be recognized in nomenclature.

Only two forms of *B. minima* appear sufficiently distinct to warrant varietal or subspecific names: *Batillaria minima rawsoni,* described as *Cerithium rawsoni* "Krebs" Möreh (1876), is definitely known from Bermuda and the Bahamas. *Batillaria minima degenerata,* described as *Cerithium* (*Pyrazus*) *septemstriatum* var. *degeneratum* Dall (1894), occurs in the Bahamas and Hispaniola.

The following names are not synonyms of *B. minima: Trochus striatellus* Dillwyn (1817), *Cerithium peloritanum* Cantraine (1835), *Cerithium laevigatum* Philippi (1844), *Cerithium nigrinum* Philippi (1848), *Cerithium desolatum* Bayle (1880), and *Cerithium heteroclytes* Lamarck (1822). (See below.)

Cerithium brongniartii Maravigna (1840), *C. hymerense* Calcara (1840) and *C. pirayni* Benoit (1843), sometimes referred to *B. minima,* are Mediterranean shells, not related to that species and not further considered here.

8. *Cerithium* (*Potamides*) *hegewischii* Philippi (1848, Zeitschr. f. Malak., 5, p. 19; 1849, Abb. Beschr. Conch., 3, pt. 4, p. 15, Pl. 1 of *Cerithium,* fig. 6) was described merely from "Mexico." Mörch (1876) thought he recognized it in a shell from Texas, evidently of what I call *Cerithidea pliculosa* (Menke) (=*iostoma* Pfeiffer). Tryon (1885, Man. of Conchol., Ser. 1, 9, p. 161; name misspelled *hegwischii*) regarded it as a synonym of the Pacific *C. montagnei* var. *pulchra* C. B. Adams (1852); while v. Martens (1900, Biol. Centr. Amer., Terr. Fluv. Moll., p. 570) treated it as a variety of the Pacific *Potamides* (*Cerithidea*) *varicosus*

[1] The supposed occurrence of this snail in Lake Erie was no doubt due to a badly written label. Possibly it bore the name of the collector (?Eyries) or the old Indian name of the Island of Trinidad ("Iere").

(Kiener), which he separated specifically from *montagnei* d'Orbigny (1841). I am inclined to accept v. Martens' view. The large *Cerithidea* of the Pacific coast, from southern California to Ecuador, are readily separable into two species, a conclusion reached long ago by Carpenter (1856). These two species bear somewhat the same relationship to each other as the Atlantic *C. pliculosa* and *C. scalariformis*.

Cerithidea montagnei (d'Orbigny), described as *Cerithium montagnei* d'Orbigny (1841, Voy. Amér. Mérid., 5, Moll., p. 443, Pl. 63, figs. 3–4; Guayaquil River, Ecuador), has strong vertical ribs, weak or no spiral ridges above the periphery, and usually no varices; sometimes there is one fine, rib-like varix on the penultimate or antepenultimate whorl; the mouth is subcircular, with the outer lip well spread out and ascending on the body-whorl; the columella is short, very thick in the adult, and has a fold on the back. Carpenter (1857, Cat. Mazatlan Shells, p. 342) recognized it correctly. He also pointed out that *Cerithium reevianum* C. B. Adams (1852, Ann. Lyc. Nat. Hist. New York, 5, p. 380; 2½ mi. E. of Panama) is the same; but that *Cerithium largillierti* Philippi (1848) is a different species, from the Far East. I have seen *C. montagnei* from Mexico (Mazatlan), San Salvador (Gulf of Fonseca), Nicaragua (Corinto) and Panama (Bella Vista; Punta Paitilla).

Cerithidea hegewischii (Philippi) has, in addition to the vertical ribs, strong spiral ridges producing tubercles where they cut the ribs; there are several (5 to 7) very thick varices, spaced along the spire; the mouth is rounded-subquadrate, with the outer lip thickened but not expanded and not ascending on the body-whorl; the columella is little or not thickened and bears no fold on the back. Philippi gave the length of his type as 15 lines (=32.7 mm.). I am unable to separate, even as a variety, *Cerithidea ? varicosa* var. *mazatlanica* Carpenter (1856, Cat. Mazatlan shells, p. 344; Mazatlan, Mexico), after examining cotypes at the Mus. Comp. Zoöl. It averages 24 mm. in length, exceptionally reaching 33 mm. Reeve (1866, Conch. Icon., 15, *Cerithidea*, Pl. 1, fig. 8) figured one of the rare specimens with only one varix well developed. I have seen typical *C. hegewischii* from Mazatlan and the coast of Sonora (Guaymas; 10 mi. N. of Guaymas;

Punta Peñasco; Kino Bay). Some of these specimens are transitional to var. *albonodosa*, to which Carpenter referred specimens from Guaymas (1864, Rept. Brit. Assoc. Adv. Sci. for 1863, p. 667).

In the northern part of its range *C. hegewischii* is more slender, with the varices lower, though conspicuously dirty white. This is *Cerithidea albonodosa* Carpenter, 1857, Proc. Zool. Soc. London for 1856, p. 205 (San Diego, California), which he later stated was probably a variety of his *mazatlanica*. Reeve (1866, Conch. Icon., 15, *Cerithidea*, Pl. 1, figs. 1*a–b*) figured it correctly. I have seen *C. hegewischii* var. *albonodosa* from California (San Diego) and Lower California (Magdalena Bay; Espiritu Santo Id.).

South of Mexico *C. hegewischii* grows much larger, with coarser sculpture, producing the var. *pulchra* (C. B. Adams), which, however, intergrades with the typical form. I have seen it from Nicaragua (Corinto), Costa Rica (Gulf of Nicoya) and Panama (Panama City; Punta Paitilla; Bella Vista; Empire, C. Z.). The following names appear to be synonyms of *pulchra*, being either preoccupied or of later date: *Cerithium varicosum* Valenciennes (1832), *Cerithium varicosum* Sowerby (1834), *Serithium validum* C. B. Adams (1852), *Cerithidea solida* "Gould" Carpenter (1857), *Cerithium fortiusculum* Bayle (1880), *Potamides meta* Li (1930), and *Cerithidea aguayoi* Clench (1934).

Cerithium pulchrum C. B. Adams, 1852, Ann. Lyc. Nat. Hist. New York, 5, p. 380 (2½ mi. E. of Panama) [1852, Panama Shells, p. 156]. According to the description this could only be the large form of *C. hegewischii*, since it has "very stout varices 240° distant." It was correctly figured by Reeve (1866, Conch. Icon., 15, *Cerithidea*, Pl. 4, fig. 29) and Kobelt (1890, Syst. Conch. Cab., 1, Abt. 26, Pl. 11, figs. 7–8). E. v. Martens' *C. montagnei* var. *pulchra* (1900, *op. cit.*, p. 570) was, however, the variant of *C. montagnei* with a single, thin, rib-like varix.

Cerithium varicosum Valenciennes, 1832, in Humboldt and Bonpland, Observ. Zool. Anat. Comp., 2, p. 282 (supposedly from Cumana, Venezuela). This is readily recognized as the large form of *C. hegewischii* of the Pacific. The type locality was erroneous, as shown by the statement that it was collected with

C. humboldtii and *C. lamarckii,* both forms of the species of *Rhinocoryne* peculiar to the Pacific coast of Central America. The specific name is preoccupied by *Cerithium varicosum* (Brocchi) Defrance, 1817.

Cerithium varicosum Sowerby, 1834, Genera of Shells, No. 42, Pl. 213, fig. 5 (with brief description in letterpress; no locality); 1855, Thesaurus Conchyl., 2, p. 887, Pl. 186, figs. 280–282 (Real Llejos or Realejo, on the Pacific coast of Nicaragua). This is clearly the same as *C. varicosum* Valenciennes, although it is described as a new species.

Cerithium validum C. B. Adams, 1852, Ann. Lyc. Nat. Hist. New York, 5, p. 381 (2½ mi. E. of Panama) [1852, Panama Shells, p. 157]. This was taken together with *C. pulchrum* and appears to be based on large and slender specimens of the latter, reaching 1.6 inch (40.6 mm.) in length, while *pulchrum* is said to be 1.25 inch (33.7 mm.) long. It is what Reeve figured as *C. varicosa* from Real Llejos (1866, Conch. Icon., 15, *Cerithidea*, Pl. 3, fig. 19*a*; his fig. 19*b*, presumably based on a specimen from Jamaica, is *C. pliculosa* Menke).

Cerithidea solida "Gould" P. P. Carpenter 1857, Rept. 26th Meet. Brit. Assoc. Adv. Sci. for 1856, p. 230 (without description; as a synonym of *valida* C. B. Ads. and *varicosa* Sow.; Panama).

Cerithium fortiusculum Bayle, 1880, Jl. de Conchyl., 28, p. 250, was a new name proposed for *Cerithium varicosum* Sowerby (1834).

Potamides meta Li, 1930, Bull. Geol. Soc. China, 9, p. 267, Pl. 6, fig. 50 (Bay of Panama; "probably recent"). As shown by Pilsbry (1931, Proc. Acad. Nat. Sci. Phila., 83, p. 433), this was based, not on a fossil, but on a worn example of *Cerithidea hegewischii* var. *pulchra* (C. B. Adams) (=*valida* C. B. Adams).

Cerithidea aguayoi Clench, 1934, Proc. Boston Soc. Nat. Hist., 40, pt. 1, p. 110 (new name for *Cerithium varicosum* Sowerby, 1834; not of Defrance, 1817; a new name was proposed by Bayle in 1880). This was included by error in the list of marine mollusks of the Atlantic coast of the United States, Sowerby's species being from the Pacific coast of Central America, as shown above. The error started with Mörch (1876, Malak. Blätt., 23, p. 88), who believed *Potamides iostoma* Pfeiffer to be Sowerby's *C. vari-*

cosum. Dall also mentioned *C. varicosa* as occurring in Texas (1889, Bull. U. S. Nat. Mus., No. 37, p. 140), these specimens being *C. pliculosa* (Menke) (= *iostoma* Pfeiffer), a species which he does not list.

9. The earliest valid name for the most common Californian Potamidid is *Cerithidea californica* (Haldeman), described as *Cerithium* (*Potamis*) *californicum* Haldeman, 1840, Monogr. Limn. Fresh-water Univ. N. America, No. 1, unnumbered back page of cover (California; with description). I have seen many lots, the species being known from Bolinas Bay to San Diego and in Lower California to Todos Santos Bay. I am not fully convinced that it is more than a race of *C. hegewischii.* Carpenter also seemed to believe that it intergrades with his *mazatlanica* (= *hegewischii*) (1864, Rept. Brit. Assoc. Adv. Sci. for 1863, p. 655). The following names are synonyms of *C. californica: Cerithium sacratum* Gould (1849), *Potamis pullatus* Gould (1855), *Cerithidea fuscata* Gould (1857), and *Pirena californica* "Nuttall" Carpenter (1857).

Cerithium (*Potamis*) *sacratum* Gould, 1849, Proc. Boston Soc. Nat. Hist., 3, p. 118 (Sacramento River, California); 1852, U. S. Explor. Exped. Wilkes, 12, Moll., p. 144, Pl. 10, figs. 166–166*a*. The northern Californian specimens of *C. californica* are often more weakly costate than those from farther south; but there are many transitions. It is possible, moreover, that Haldeman's types came from near San Francisco.

Potamis pullatus Gould, 1855, Explor. Surv. R. R. Mississippi to Pacific, App. to Prelim. Geol. Rept., p. 25 (San Diego, California); 1856, Repts. Explor. Surv. R. R. Mississippi to Pacific, 5, pt. 2, p. 333, Pl. 11, figs. 23–24. This was based on typical, strongly costulate *C. californica.*

Cerithidea fuscata [*Potamis fuscata*] Gould, 1857, Proc. Zool. Soc. London for 1856, p. 206 (San Diego, California). Based on typical, strongly costulate *C. californica.*

Pirena californica "Nuttall MS" was cited by Carpenter (1857, Proc. Zool. Soc. London for 1856, p. 206) as a synonym of *C. fuscata* Gould.

Cerithidea californica var. *hyporhyssa* (Berry). Described as *Cerithidea sacrata* var. *hyporhyssa* Berry, 1906, Nautilus, 19,

p. 133, fig. (San Diego, California), this is no more than an ecological form, characterized by the smooth or nearly smooth, flat whorls. It intergrades with typical *californica* in the type locality.

10. *Cerithium hanleyi* Sowerby, 1855, Thesaurus Conchyl., 2, p. 874, Pl. 183, fig. 193 (no locality). This is a true *Cerithium,* by the deep, oblique basal channel, and the sinus in the upper angle of the mouth. It seems to be identical with *Cerithium rubro-lineatum* Sowerby (1855, *op. cit.,* 2, p. 874, Pl. 183, fig. 199), as Tryon recognized. *Cerithidea hanleyana* Reeve, 1866, is a true *Cerithidea* (*C. scalariformis* Say), but it is not Sowerby's *C. hanleyi.*

11. *Cerithium heteroclytes* Lamarck, 1822, Hist. Nat. An. sans Vert., 7, p. 74 ("mers de la Nouvelle-Hollande"). The size (15¾ French lines = 35.5 mm.) alone makes the reference to *Batillaria minima* impossible, the largest specimen seen of the latter being only 21.5 mm. long (usual size, 12 to 18 mm.). Lamarck states that the specimen was given to him by Macleay, hence there is no reason to doubt his locality. His shell was most probably a deformed specimen of *Batillaria australis* (Quoy and Gaimard, 1834), and I have seen one from Tasmania which fits the description. If this synonymy is correct, the Australian species will have to be called *Batillaria heteroclytes* (Lamarck). On the other hand, *Cerithium heteroclytes* Potiez and Michaud, 1838, Gal. Moll. Douai, 1, p. 365, Pl. 31, figs. 21–22 (without locality), was not Lamarck's species, but a deformed *Batillaria minima.* The figure, supposedly natural size (according to Expl. of Plates, p. 49), is only 18.3 mm. long.

12. The following names appear to be based on the Mediterranean *Pirenella conica* (Blainville, 1829):

Cerithium peloritanum Cantraine, 1835, Bull. Acad. Bruxelles, 2, p. 392 (near the lighthouse at Messina, Sicily). The erroneous listing of this name as a synonym of *Batillaria minima* was due to the fact that Kiener's (figured) *C. peloritanum* (1841–1842), from "the coasts of Florida," was the North American species.

Cerithium laevigatum Philippi, 1844, Enum. Moll. Siciliae, 2, p. 161, Pl. 25, fig. 32 (Sea of Sicily) (not of Eichwald, 1830). Apparently based on a worn *P. conica;* certainly not *Batillaria minima.*

Cerithium desolatum Bayle, 1880, Jl. de Conchyl., 28, p. 247, is a new name for *Cerithium laevigatum* Philippi (1844); hence also a probable synonym of *P. conica.*

13. *Cerithium nigrinum* Philippi, 1848, Zeitschr. f. Malak., 5, p. 24 (no locality); 1849, Abb. Beschr. Conch., 3, pt. 4, p. 20, Pl. 1 of *Cerithium,* fig. 19. This is a synonym of *Cerithium variabile* C. B. Adams, 1845 (*Cerithium ferrugineum* Say, 1832; not of Bruguière, 1792). The characters which Philippi uses to differentiate his *nigrinum* from Say's *septemstriatum* are precisely those that separate *C. variabile* from *Batillaria minima.*

14. *Trochus striatellus* Dillwyn, 1817, Descr. Cat. Rec. Shells, 2, p. 213, is merely *Trochus striatellus* Linnaeus, 1758, Syst. Nat., 10th Ed., 1, p. 760, from the Mediterranean, the only definite synonym cited by Dillwyn. He adds, as doubtful synonyms only: *Cerithium zonale* Bruguière, *Murex minimus* Gmelin and Lister's fig. 81, Pl. 1018 of the Hist. Conchyl. The species is unrecognized, but there is no reason to believe that it could have been *Batillaria minima.* Hanley (1855, Ipsa Linnaei Conchylia, p. 325) says it was not in Linnaeus' own collection. He regards Bruguière's doubtful synonymy with *Cerithium zonale* as disagreeing with part of the original description.

15. The earliest correct name for the only known species of *Rhinocoryne* v. Martens (1900), of the eastern Pacific, is *R. humboldti* (Valenciennes). This was described as *Cerithium humboldti* Valenciennes, 1832, in Humboldt and Bonpland, Observ. Zool. Anat. Comp., 2, p. 280 (supposedly from Cumana) and is readily recognized. The type, was, however, not found at Cumana, Venezuela, but somewhere on the Pacific coast of South or Central America. Kiener (1841–1842, Spec. Gén. Icon. Coq. Viv., 6, *Cerithium,* p. 83, Pl. 26, fig. 2) apparently figures the type.[2]

Cerithium lamarckii Valenciennes, 1832, *op. cit.,* 2, p. 281 (from the same locality as *C. humboldti*), is the rare individual variant of *R. humboldti* with two peripheral rows of spinose tubercles, instead of one. At the Museum of Comp. Zoöl., one such speci-

[2] In the copy at Mus. Comp. Zoöl., the section of Kiener's work covering the "Famille des Canalifères" is bound as vol. 6. In other copies, this forms vol. 4.

men was found among some 50 normal ones, all from Panama. It might be called *R. humboldti* var. *lamarckii,* but is scarcely worth naming. Kiener presumably figured the type (1841–1842, *op. cit.,* p. 84, Pl. 27, fig. 3).

Cerithium pacificum Sowerby, 1834, Genera of Shells, No. 42, Pl. 213, fig. 9 (without locality or description). This is a synonym of the earlier *Rhinocoryne humboldti* (Valenciennes), as Kiener pointed out a century ago. It was based on the typical form, with one row of spines.

16. It has been claimed that both *Cerithidea costata* (da Costa) and *Batillaria minima* (Gmelin) live not only in the Western Atlantic, but also in the Mediterranean, on the coast of Sicily. Aradas and Benoit (1870, Conchigliologia Viv. Marina Sicilia, pp. 231–233) report the first as "*Cerithium costatum,*" and the second as "*Cerithium eriense,*" and believe that both were introduced alive from the Antilles, attached to the bottom of ships. Having seen no Sicilian specimens, I am unable to dispute the identifications. If these were correct, it is more probable that the shells were imported in ship's ballast. That they now occur alive and are acclimatized in Sicily needs confirmation.

THE HABITS OF LIFE OF SOME WEST COAST BIVALVES

BY DR. FRITZ HAAS
Chicago, Ill.

(Concluded from page 113)

3. *On Some Members of the Mytilus californianus Association.* The California mussel certainly is one of the commonest, if not the commonest bivalve of the West Coast. Thanks to a comparatively heavy shell and to strong byssus threads, the species is enabled to maintain itself even in habitats which, because of the heavy surf which beats them, would be uninhabitable for other mollusks. Wharfpiles and cliffs which otherwise would be almost destitute of an epifauna, may have a pad of mussels packed side by side and mostly covering the substratum to invisibility. Other organisms which are not so perfectly protected against the surf action, invariably settle on and between the California mussels

and since the composition of this accompanying fauna is locally rather constant, we are entitled to speak of a well-defined "*Mytilus californianus* association." I have just referred to the species of this association as "locally constant"; this means that within the wide range of *Mytilus californianus,* which is only little affected by varying water temperature, its associated forms vary according to the great difference of the water temperature south and north of Point Conception. Some of these forms accompany the Mytilus in almost its whole range, some have their northern limit at Point Conception, while on the other hand, northern species do not occur south of this point.

My own experience deals with only a few members of the *Mytilus californianus* association.

In southern California, the most obvious animal accompanying this association is another mytilid, characterized by a radiating sculpture on its shell. Its correct name is *Brachidontes* (*Hormomya*) *multiformis* Carpenter, but it is mostly quoted in the literature as *Mytilus adamsianus* Dunker or *Mytilus stearnsii* Pilsbry and Raymond; it is not a true *Mytilus,* but has to be placed in the genus *Brachidontes* Swainson, subgenus *Hormomya* Moerch, whose type species is the Atlantic *Mytilus exustus* Lamarck. Intermixed with the *Brachidontes multiformis* in the same association, but generally in much inferior numbers, lives another sculptured mytilid, very similar to *multiformis* in size and shape, but actually very different: *Septifer bifurcatus* Conrad. I found that the two species are very often confounded by the Californian collectors. You will note that in *Brachidontes multiformis* the umbo is only subterminal, very inflated and therefore projecting beyond the ventral margin, while in *Septifer* it is terminal, flatter, and not projecting. The inner surface of the shells exhibits a still more striking difference in the septum from which *Septifer* has its name, which is entirely lacking in *Brachidontes.*

At the present time, only *Brachidontes multiformis* interests us, since it is the host shell of two commensal bivalves of the genus *Lasaea, L. cistula* Keen and *L. subviridis* Dall. Both species are rather common at La Jolla, and I found them exclusively on the shell or the byssus of *Brachidontes multiformis;* not a single

specimen lived on *Septifer* or on the much more abundant *Mytilus californianus!* This statement fully agrees with an earlier observation made by Charles R. Orcutt who too, according to a notice on a label in the San Diego Museum, collected lasaeas on *Brachidontes multiformis.* Several lasaeas, however, were detected in dead *Donax*-shells or in cups of *Balanus,* but on these objects, one or several *Brachidontes* had fastened their byssus, so that even in these seemingly aberrant habitats the close relation with this mytilid is maintained.

An association analogous to that of the California mussel, is developed in Peruvian waters, where *Mytilus californianus* is replaced by its close relative *M. magellanicus* Chemnitz and *Brachidontes multiformis* by the almost identical *Brach. granulatus* Hanley. In a thick bunch of a *Mytilus magellanicus* association scraped off from rocks at Chincha Norte Island, Peru, *Brachidontes granulatus* was represented by a fair number of specimens and on them, and exclusively on them, some lasaeas were found which I have provisionally classified as *Lasaea miliaris* Philippi, though they are practically inseparable from the North American *Lasaea cistula* Keen; the specific name, however, is of no importance relative to the fact that in this Peruvian locality a species of *Lasaea* restricts its habitat to a mytilid which constitutes only a minority among the leading species of the association.

In spite of this supporting case from Peru, the observation made in southern California, that *Lasaea* does not live in close community with the commonest mytilid, but only with an accompanying species, cannot be generalized. North of Point Conception, *Brachidontes multiformis* does not occur, its place in the *Mytilus californianus* association being vacant. But both the species of *Lasaea* are found north of Point Conception, and at Pacific Grove, the only locality north of this point where I collected, I found them on the shell and on the byssus of the dominant *Mytilus californianus* itself! The only possible explanation of this strange behavior is that while the lasaeas prefer *Brachidontes* to all other host shells, *Mytilus californianus* is a second choice, to which they attach themselves when no *Brachidontes* are available, but the details of their commensalistic relation to these mytilids are still entirely unknown.

For the sake of completeness, it must be mentioned that, at Pacific Grove, I washed out both species of *Lasaea* from fastholds of kelp, where they cannot have led a commensalistic life and where they must have retired for protection only. My failure to detect free living lasaeas in similar habitats at La Jolla by no means proves that they cannot occur there.

NOTES AND NEWS

Exact Dates of the Nautilus.—Vol. 55 (1) : pp. 1–36 + i–viii (index and title-pages of vol. 54), pls. 1–2, was mailed July 11, 1941; (2) : 37–72, pls. 3–5, Oct. 24, 1941; (3) : 73–108, pls. 6–7, Jan. 12, 1942; (4) : 109–144, pl. 8, May 7, 1942.—H.B.B.

We are grieved to record the death of Frank Collins Baker, on May 7th. A notice of his life and work will appear later.

Agriodesma.—In the original description of *Pitar felipponei* Dall, 1916 (Nautilus 29 (10) p. 113), it is introduced as "*Callocardia* (*Agriodesma*) *felipponei*, n. sp." The subgeneric name used here has puzzled me for some time. After a check of the literature I came to the conclusion that it is either a typographical error or a slip of the pen on the part of Dall. I believe *Agriopoma* Dall, 1902, was intended. He stated in his remarks that the species *felipponei* is closely allied to *aresta* Dall, which is listed in the 1902 Synopsis under *Agriopoma*. Under present usage the species would be called *Pitar* (*Pitar*) *felipponei* (Dall). —R. A. McLean.

Goniobasis livescens in Douglas Lake, Michigan.—In 1912, 14th Rept. Mich. Acad. Sci.: 209, the original absence of this species was noted, with the hypothesis that it immigrated into nearby lakes from the south after the time of the glacial Lake Algonquin. At the time, the objection was made that this absence might be due to some unknown environmental factor, which rendered Douglas Lake unsuitable for this species. To test this objection, in 1913 two lots of *G. livescens*, from near the north end of the east shore of Burt Lake, were planted, one in North and the other in South Fishtail Bays, near the east end of Douglas Lake. When

the region was revisited during the summer of 1927, the descendants of the second lot had become very numerous and had spread as far as Grapevine Point, but no individuals were found in North Fishtail. So far as I can remember, the facts have not been published previously in regard to this artificial introduction of a species into a lake where it was formerly absent.—H. Burrington Baker.

Record Find of Truncatella.—On February 22, 1928, my son, O. C. Van Hyning and myself found under a six-foot rotten cabbage palm log on the premises of Mrs. Hattie E. Gore, Postmistress of Captiva Island, Lee County, Flordia, the following list of *Truncatella:*

12,853 *Truncatella bilabiata* Pfeiffer.
7,554 *Truncatella caribaeensis* Reeve.
6,679 *Truncatella caribaeensis succinea* Adams.
10,632 *Truncatella* too young for identification.

In all, 37,868 shells. This number is what we easily scraped up with our hands from under the log. With care and time we could have gathered a considerable more.— T. Van Hyning.

Viability of a Marine Snail.—On October 5, 1941, Miss Betty Hammerly, member of an expedition of the California Academy of Sciences, picked up near La Paz, Baja California, Mexico, a pound or two of moist gravel in which small shells were abundant. This was placed in a large tin can; enclosed with the sand was a small, tightly-sealed tin can in which were a few beach shells, some dry cotton, and two live *Nerita scabricosta* Lamarck. The lid of the outer tin was fastened down with adhesive tape. This material was donated to Stanford University February 5, 1942. When the inner can was opened, one of the nerites was observed to be alive. Since here was a ready-made desiccation experiment, the can was closed and thereafter observations were made once a week to determine how long the snail could live. On February 20 it seemed to be dead. The sand was then transferred to a shallow pan and covered with fresh water. Placed in this, the snail emerged in about an hour and began trying to feed. When the fresh water was replaced by sea water the snail became moderately active and moved about among the gravelly sand scraping what

nutriment it could from the bits of rock. An algae-covered stone from Monterey was offered but this food was not acceptable. Because of the lack of suitable food the nerite grew feebler and died sometime during the week-end of March 7–8, 1942, five months after it had been removed from its proper habitat. During four and a half months of this time it had been without food and water, its own moisture conserved only by a pad of dry cotton in which it was packed and by the tight sealing of the can. The moist gravel in the outer container would have been of some aid, perhaps, in retaining a humid atmosphere in the small tin.

There are three points of significance in this record: first, the evidence that at least some of the Neritidae are by way of becoming adapted to life away from the ocean, thus supporting the conclusions of malacologists that the pulmonates have descended from such marine groups as *Littorina* and *Nerita;* second, the demonstration of the plasticity which organisms must develop in order to live successfully in the rigorous environment of the intertidal zone. Third, the viability of this specimen suggests that under favorable conditions adult marine snails might be able to survive transportation over considerable distances (as by floating logs) and that species-migrations in the past might have involved some adult mollusks as well as larval forms.—A. Myra Keen.

Albinos of *Muricidea ostrearum* Conrad.—During the winter of 1941–1942 a series of specimens of *Muricidea ostrearum* Conrad was collected along the Florida west coast. Examination of the shells revealed the fact that there were a number of albinos in the two lots taken. Those collected in Venice Bay, Sarasota County, numbered 173 specimens, and of this lot 46 were albinos; while the lot collected at Punta Gorda Beach, Charlotte County, numbering 402 specimens, contained but 10 albinos. It seems that the center of abundance of these albinos is Venice Bay, for the proportion of albinos to normally colored specimens is roughly 25 per cent, contrasted with the 2½ per cent of albinos taken at Punta Gorda Beach. A number of the specimens from Venice Bay show much loss of color, but have a few faint markings. This species was apparently feeding upon oysters in company

with *Muricidea multangula* Philippi and *Urosalpinx perrugatus* Conrad.

Albinism among mollusks of various families found along the west coast of Florida has often been noted. Albino specimens of *Strombus alatus* Gmelin are not infrequently found all the way south from Tampa to Bonita Springs, Sanibel and Marco, and specimens with some color, but strongly albinistic in character are often seen. There are many pure white specimens of *Cancellaria reticulata* L. found in the region about Naples, Florida.—B. R. BALES, M.D.

PUBLICATIONS RECEIVED

LAND SHELLS OF THE BIMINI ISLANDS, Bahama Islands (Proc. New England Zool. Club. 19 : 53–67. 1942). By Wm. J. Clench. Some snails of these little cays, between Andros and Florida, have been noticed by Dall, Pilsbry and Clapp. Clench's additions, including *Melampus* and *Detracia,* bring the list to 28 species. The slender evidence for *Oxystyla undata* on the Biminis is given from Bland's manuscript. The two cerions, *C. biminiense* and *C. pillsburyi*, appear to be the only snails special to the islands. The name *Plagioptycha macrodon* Menke is used to replace *P. duclosiana* Fér., owing to a misapprehension on the part of the author as to the date of Férussac's name. The correct reference to the Histoire is pl. 51 A (not 5A), fig. 6. The name *Helix duclosiana* was published on p. ii of the *Explication des Planches*, issued with livraison 22 (1822). This species will therefore continue to stand as *duclosiana* Fér.—H.A.P.

JOHNSONIA, numbers 4 and 5. No. 4 relates to the genera *Tectarius* and *Echininus* (new name for *Nina* Gray, 1850, not of Horsfield, 1829), by W. J. Clench and R. T. Abbott. No. 5 comprises the genera *Cerithidea* and *Batillaria*, by Jos. C. Bequaert. Several of the species described in these two numbers have not been well understood, and some errors of long standing are corrected. The illustrations continue the high standard of earlier parts.

THE NAUTILUS

Vol. 56 October, 1942 No. 2

A NEW GENUS OF MEXICAN HELICIDS

By H. BURRINGTON BAKER

This is the 9th paper on the inland Mexican mollusks collected in 1926 for Dr. Bryant Walker. In the plate, the scales represent lengths of one millimeter, except those for figure 4 (.01 mm.) and 4–T (.1 mm.). Abbreviations not explained in the text are tabulated in Bishop Museum Bulletin 166, p. 337 (1941).

BUNNYA BERNADINAE, new genus and species. Plate 5.

The single type specimen (University of Michigan Museum) was collected Sept. 3, on the wall of the old monastery at El Desierto de los Leónes (C, II, 11, b), altitude 9800 ft., D. F. *B. bernadinae,* named for my wife, is the type of the genus *Bunnya,* which agrees so closely with *Xanthonyx,* in shell, mantle reflection, form of body, tail "horn" and arrangement of pallial complex, that the two genera must be closely related. But, *Bunnya* differs markedly in its 3 double dart-sacs, producing 6 darts, and in the sharply differentiated sculpture on the embryonic whorls of its shell. In fact, in its genitalia, *Bunnya* appears to approach *Humboldtiana,* which occurs with it in the temperate zone, although the tropical *Xanthonyx* has more in common with *Averellia.* From the description, *Xanthonyx potosiana* Dall (1905, Smithson. Misc. Coll. 48: 190) from the Alvarez Mts., San Luis Potosí, seems to have similar embryonic whorls and may be a *Bunnya,* but is a larger rimate shell, with more rapid whorl increase, longer columellar callus and apparently with its later growth-wrinkles somewhat stronger.

Shell (figs. 1–2) imperforate but with foveola deep and narrow (although half open inside aperture); whorls rapidly increasing, depressed but well rounded; thin and translucent, slightly glossy, light brownish buff colored, somewhat darker at apex, with irides-

cent interior when fresh. Embryonic whorls 1¼, with first quarter whorl sunken, soon assuming quite sharp and regular but low, closely spaced (14 per mm. on last) and arcuate growth-wrinkles, crossed by microscopic spiral ones; suture deep. Later whorls immediately assuming more widely spaced but much more irregular, weakly rounded and arcuate growth-wrinkles; spirals obsolescent and broken (major ones absent); suture more broadly but fairly well impressed. Aperture large, transversely ovoid in plane about 45° to shell-axis; peristome arcuate above, sharp and thin. Parietal callus only indicated by obsolescence of growth-wrinkles. Columella sharp, scarcely thickened, with short adnate callus.

Shell altitude 9.9 mm., major diameter 129 (12.8 mm.) [at 2 whorls 6.75 mm., 2¼ wh. 8.2 mm., 2.5 wh. 11.05 mm., 2¾ wh. 17 mm.?], min. diam. 96 (9.45 mm.); aperture altitude 81 (8.05 mm.), diam. 117 (9.45 mm.); 2.6+whorls [over 2¾ to parietal angle].

Living animal softer and less vigorous than *X. cordovanus;* tail "horn" very prominent and constantly wiggling; foot yellowish with irregular black blotches, which are larger anteriad and tend to form 2 longitudinal bands, separated by about ⅓ top of head; tentacles black. Shell-lap continuous, without shell-lobes, reflected about 5 mm. over shell on right side, and with irregularly radial black marks.

Preserved animal with tail rounded above; middorsal groove weak and irregular; "horn" about twice as long as its base and papillate. Shell-lap narrowest anteriorally over head; over twice as extensive caudad, where it is coarsely papillate (elsewhere smoothish). Mantle collar (fig. 3; only .6 perimeter shown and viewed from inside so shell-lap hidden) with prominent parietal mantle-lappet (MR) and small angulopalatal one (MA), which is widely separated, across neck, from basopalatal (MP; less than half shown) that is short but extensive (about .4 perimeter) and lies on left side. Lung 1.5 length of kidney (K) which is about twice pericardium (H), much shortened along hindgut (HG) side and bent abruptly at anterior end of pericardium; ureter (KD) complete; urinary sinus (LK) narrow; minor venation (mainly omitted) very evident over kidney and on right side of animal but almost absent to the left. Ovotestis (G, fig. 6; spermoviduct much straightened) a biconic mass of irregularly clavate alveoli, almost completely buried in basal ⅔ of apical liver lobe; talon (uncovered at GT) much as in *Humboldtiana;* albumen gland (GG) with apical lobe above and basal one below posterior end of diaphragm. Uterus (UT) widely convoluted and folded to fit in short body cavity. Spermatheca longer than

body cavity, with sac (S) above aorta and near albumen gland; diverticulum (SD) and junction inflated by flocculent material but with no traces of horny spermatophore. Dart-glands (WG) 3, compound alveolar, loosely bound by connective tissue into a ring, and with short ducts (WD, f. 9; viewed from ventral side) running in vaginal wall to between openings of dart-sacs. Dart-sacs (WS) 3; each basally with 2 fusiform muscular dart-papilla sacs (WPS), which open either side of dart-papilla; internally (fig. 8; very diagrammatic longitudinal section) double at apex and secreting 2 darts (WB); dart-papilla (WP) single and short; vaginal entrance surrounded by a fold which is higher on either side, so as to form 2 lips. Darts (5 found in dart-sacs) decalcified by alcohol, but evidently very like those of *Humboldtiana*. Vagina (V) below dart apparatus longitudinally plicate internally, with a short ventral diverticulum (VD), which contained a shed dart. Prostate (DG) attached full length of uterus. Epiphallus (E) large with short flagellum (EF); internally (transverse section at E, fig. 6) with 4 large pilasters. Penial retractor (PR) arising near apical end of diaphragm and inserting around penial apex. Penis (P) too small to contain large, externally wrinkled and papillate, cylindric verge (PV, fig. 7; half of penial wall removed), with epiphallic opening (EP) between 3 flattened papillae at tip. Atrium (Y) opening just behind right inferior tentacle. Jaw (fig. 5) with 10 flat ribs or plaits, of which only outer edges are sharply marked; growth-lines prominent. Buccal mass ovoid; salivary glands about as long, lanceolate and separated. Radula (fig. 4): central with triangular mesocone and weak ectoconal notches; laterals 12–13, mainly bicuspid (right 2nd has 2 ectocones), with obtusely pointed to abruptly rounded mesocone; marginals 19–18, usually tricuspid, but outermost irregularly dividing side cusps; 115 rows (T) counted. Oesophagus slender only to nerve ring; remainder enlarged and continuous with stomach; intestinal S-loops as usual; anus external, below and shortly behind pneumostome. Cerebral commissure short but distinct; penial nerve from right cerebral ganglion; buccal commissure as long as each ganglion; pleural connectives shorter than each cerebral ganglion; visceral ring ganglia almost fused. Lateral pedal retractors apparently fused to tail fan. Right tentacular muscle almost free; right ommatophoral retractor in penioviducal angle; retractors of inferior tentacles with short branches to region around corner of mouth. Very slender buccal retractor arising from left tentacular muscle.

Xanthonyx cordovanus (Pfeiffer). Strebel und Pfeffer, Beitrag 4: 37, anatomy. Cf. *X. sumichrasti* (Brot),

Fischer et Crosse, Miss. Mex. 1: 192, and *X. salleanus* (Pfr.), Pils., Proc. Malac. Soc. London 4: 28.

My one specimen, from a tree-trunk in the creek valley below Sumidero (D, II, c, 6), near Córdoba, was so firmly muscular and wiggled so furiously that I was startled into dropping it. The embryonic whorls of its shell are as in *X. cordovanus* but the later whorls approach those of *X. salleanus* and are much more glossy than those of *Bunnya*. Although its male organs are quite large, its female genitalia are still immature, and possibly the spermathecal diverticulum becomes less conspicuous when fully adult. [S. & P. found none.]

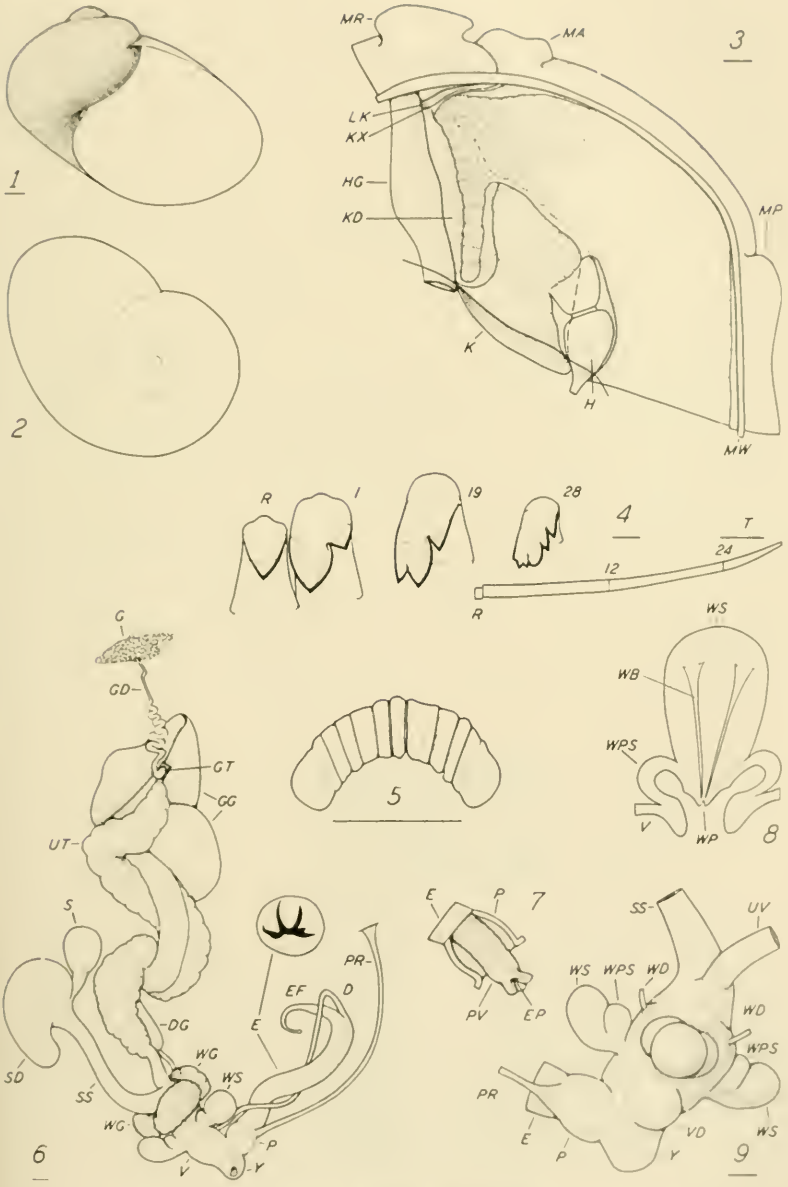
Living animal like *Bunnya*, but: Foot pallid, mottled with brown; tail with brown middorsal stripe; ommatophores dark; edge of shell-lap brown.

Preserved animal also similar but: Shell-lap about twice as broad and coarsely pebbled throughout. [In S. & P., figs. 7, A–B, appearance of shell-lobes and short tail "horn" evidently due to contraction.] Lung considerably smaller, with brownish bands; kidney with much more shortened hindgut margin so that shape appears more oblong [Cf. S. & P., f. 7–C] Spermatheca very slender but with distinct cylindric diverticulum [like in *X. sumichrasti*]. Dart-glands 2, with few tubules [probably more in adult], with ducts entering vaginal wall above still rudimentary dart-sac. [Cf. S. & P., f. 7–F; gm_1 = dart-glands; gm = dart-sac, placed like vaginal diverticulum of *Bunnya*.] Epiphallus proper very much shorter than flagellum [like Pils., f. 14]; penial retractor inserting around junction with penis, which is relatively larger; vergic papilla flattened ovoid [like S. & P., f. 7–G], with epiphallic opening near its base but continued to apex by deep groove [somewhat as in *Averellia*]. Jaw with 11–13, higher ribs, of which both edges are sharply marked [see S. & P.] about 14 teeth bicuspid and 20 with some trace of entocone [S. & P. give 22 bicuspid and 10 tricuspid]; outer teeth more commonly dividing entocones and ectocones; 131 rows counted. Buccal retractor even slenderer, but with similar origin [Cf. Pils.].

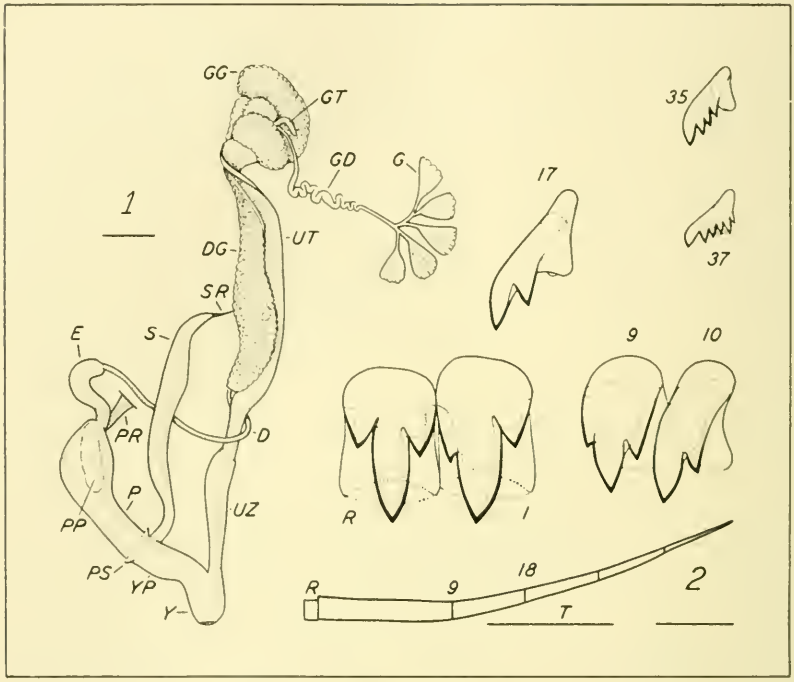
A NEW GENUS OF CHINESE MICROCYSTINAE

By H. Burrington Baker

Through the generosity of Mr. Teng-chien Yen, the anatomy (Plate 6) of a specimen of *Hyalina rathouisii* Heude (1882, Moll.



Figs. 1–9. *Bunaya bernadinae*.



Figs. 1–2, *Tongchiona rathouisii*.

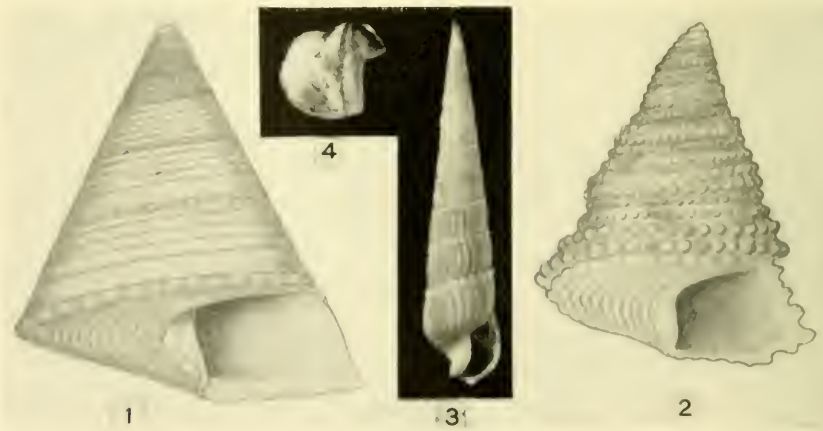


Fig. 1. *Callostoma faustum*, page 14. 2, *Callostoma fascinans*, p. 15. 3, *Terebra glossema*. 4, *Xylophaga atlantica*.

terr. Fl. Bleu: 14), from Ling-Ying, West Lake, Hangchow, China, has been studied. Surprisingly, it appears to represent a group of Microcystinae (Helicarionidae), which is not known from the islands of the Pacific Ocean, and is now made the type of a new genus, *Tengchiena*. The shell of *T. rathouisii* somewhat resembles that of *Liardetia*, and has rather heavy, but irregular growth-wrinkles, which obscure the spiral striae above the acute angle of its later whorls, a smoothish base with more conspicuous spirals, and a similar externally rimate umbilicus, which is internally closed by a thin callus. But, it is heavier and larger. Since it lacks a penial appendix, *T. rathouisii* appears anatomically closer to the Fijian subgenus *Laua* of *Diastole*, from which it differs in its large spermatheca, short epiphallus, apically swollen penis with heavy stimulator fold, simply bicuspid radular marginals, and superficially rimate shell.

Animal like *Diastole* (*Laua*) *lauae* H.B.B. (1938, Bishop Mus. Bull. 158: 55) but: Unpigmented, except for black ommatophores. Lung colorless, 7 times as long as its base or 4 times kidney length, which is thrice its base or 1.5 times pericardium. Ovotestis (G, f. 1; scale = 1 mm.) with 5 triangular lobes of few clavate alveoli, imbedded in basal half of apical liver lobe. Recurved talon (GT) exposed; smaller irregularly ovoid carrefour imbedded in albumen gland (GG). Uterus (UT) not gravid. Spermatheca (S) thin walled, elongate fusiform, with short stalk. Epiphallus (E) small, entering near penial apex and insertion of retractor (PR). Penis (P) internally, in basal half with two pilasters, one of which is continuous with large and high, transversely convoluted fold (outlined at PP) in apical half. Jaw with weak rounded median lobe. Radula (fig. 2; scale = .01 mm.) with 9 tricuspid laterals, 17–19 slender bicuspid marginals and 19–17 short outer marginals with additional cusps; 98 transverse rows (T; scale = .1 mm.; blocks of 9 teeth indicated).

FIELD NOTES ON SOME WEST COAST MOLLUSKS

By E. P. CHACE

During the winter of 1941–42 Mrs. Chace and I did quite a bit of collecting near Monterey. We made several trips to Del Monte Beach and found and broke up many chunks of shale that had come in from the bottom of the bay. One in particular was very thrilling: a block nearly 3 feet square and 18 inches thick. When

I broke it up I found several fine specimens of *Parapholas californicus* Conr., 4½ to 5 inches long, all dead but well-preserved shells. When washing these out I saw that one of them had other shells inside and on separating the valves I found 1 *Paphia staminea* 2¼ inches long, 4 others about 1 inch long and 1 beautifully frilly specimen of *Venerupis lamellifera* Conr., 1½ inches long. What little space was left inside the pholad was filled with sand. In this same rock were some *Adula falcata* Gld. 3½ inches long and a few *Lithophagus plumula* Hanley. Other rocks broken the same day added the following species to the list of borers and nestlers. *Pholadidea ovoidea* Gld., *P. penita* Conr., *P. rostrata* Val., 1 *Schizothaerus nuttallii* Conr., *Adula californiensis* Phil, *Kellia laperousii* Desh., *Petricola carditoides* Conr., *Saxicava pholadis* Linn., *Entodesma saxicola* Baird., *Cumingia lamellosa* Sby., 2 *Pododesmus macroschisma* Desh., and 2 fine *Paphia staminea ruderata* Desh., and several *Crepidula nummarius* Gld. var. *perforans* Val.

Some of the *Venerupis lamellifera* were quite small and flat, and showed fine radial sculpture between the beautifully developed frills. They had not grown large enough to fill the holes in which they were nestling. Others taken from *Lithophagus* holes were long and narrow and fitted the holes so closely that the frills were all worn off except on the posterior portion. These had a superficial resemblance to *Petricola carditoides*. Nearly all of the *Paphia* were the normal form but 3 or 4 had the frills of var. *ruderata* Desh. very strongly developed, so that at first glance they could be taken for specimens of *Venerupis lamellifera*.

One of the *Kellia laperousii* Desh. that I took from the shale at Del Monte Beach was the largest that I have ever seen, measuring 33 × 26 mm.

Collecting near Point Pinos was quite interesting and the highlights of that locality were: three live specimens and several dead pairs of *Venerupis lamellifera* from a thin seam of gravel that was exposed when I pried off a large slab of ledge rock. A goodly number of *Acmaea triangularis* Cpr. *alive*. I believe its usual situs is known to few collectors. It lives on the stems of calcareous, pink algae and usually the alga grows on the shells also, making them very difficult to see. *Acmaea ochracea* Dall, not

common in collections, was found living on small rocks in the deeper tide-pools, collectable only at a minus tide. It bears a superficial resemblance to the young of *A. limatula*, but this latter species lives up at the mid-tide level.

Chiton collecting here was good; 26 species were found. The highlights were *Callistochiton connellyi* Willett, previously known only from the type locality near Ensenada, Lower California, and *Lepidochitona lowei* Pils.

Another interesting find was made a few miles south of Carmel. This was a large, heavy specimen of *Marcia kennerleyi* (Cpr.) Rve., dead, but the valves still held together by the ligament.

While collecting at Morro Bay several years ago we found *Cryptomya californica* Conr. which has very short siphons, living about 6 inches below the surface but adjacent to the numerous crab burrows into which it extended its siphons.

Regarding the West Coast mytilids: students here on the coast consider *Mytilus multiformis* Cpr. a good species, of the Mexican and Central American coasts. It is very small, seldom reaching ½ inch, and grows in large mats on the surface of rocks. The northern limit of its range is Cape San Lucas. *Mytilus adamsianus* Dunker is listed from Santa Barbara to Panama (Mr. H. N. Lowe listed it from San Juan del Sur, Nicaragua). At present California collectors are calling our local shell *M. adamsianus*, but it is possible that future study may show differences between our California shell and those from further south. In that case the name *stearnsi* Pils. & Raym. may be available for our California shell.

Along the coasts of Los Angeles and Orange counties large colonies of *Lasaea* live in crevices of the ledge rock. Sometimes, but by no means always, *M. adamsianus* lives in the edges of these same crevices with the end of the shell exposed to the light. *Septifer bifurcatus*, on the other hand, is usually well hidden from the light.

COLOR VARIATION IN OLIVELLA BIPLICATA IN VARIOUS LOCALITIES

By D. S. AND E. W. GIFFORD

In The Nautilus, volume 55, pages 10–12, we published an account of color variation in a series of 2757 specimens of *Olivella*

biplicata collected alive at Bolinas, Marin County, California. Subsequently, we have collected in other localities with the idea of determining if the percentages for the color variations were the same everywhere. There became apparent a considerable deviation in this regard at different localities.

The places at which we collected range from Port Orford, Oregon, in the north, to Ensenada, Baja California, in the south. Including the published Bolinas series, we have the following: Port Orford, Curry County, Oregon, 553 specimens; Crescent City, Del Notre County, California, 978; Trinidad, Humboldt County, California, 911; Tomales Bay, Marin County, California, 558; Bolinas, Marin County, California, 2757; Santa Cruz, Santa Cruz County, California, 1806; Monterey, Monterey County, California, 1199; Morro Bay, San Luis Obispo County, California, 514; Santa Barbara, Santa Barbara County, California, 695; Ensenada, Baja California, 4. This makes a grand total of 9975.

The xanthochroistic specimen found at Bolinas was not duplicated, so it remains unique in a series of 9975. It is the only specimen that lacks the characteristic purple coloring near the canal, which gives this species its common name of Purple Olive Shell.

In the following counts we shall distinguish two main categories: (a) shells with no trace of orange in aperture, (b) shells with orange in aperture. Within these two categories we shall separate "normal" colored shells from albinos. The so-called normal color range will be as defined in the preceding article (page 10, third paragraph). Lastly, (c) we shall record the total albino count.

Our table reveals Santa Cruz as the center of abundance (35%) of shells with trace or more of orange in the aperture. Then follows Monterey, across Monterey Bay from Santa Cruz, with 25%. Crescent City ranks third with 13%, Bolinas fourth with 11%. It is remarkable that Tomales Bay, north of Bolinas, runs only 2%, and Trinidad, south of Crescent City, runs less than 1%. Both lie between Crescent City and Bolinas. Port Orford, north of Crescent City, also yields less than 1% of shells with trace of orange. It is evident that somewhat different heredities mark the populations of different localities. For occurrence of orange in the aperture, there are with certainty two centers: (a) Crescent

COLOR VARIATION IN *OLIVELLA BIPLICATA* IN TEN LOCALITIES

Locality	Total	No Orange in Aperture	No Orange: Normal	No Orange: Albino	Orange in Aperture	Orange: Normal	Orange: Albino	Total Albino
Port Orford	553	550(99%)	549	1	3(1%)	3	0	1(1%)
Crescent City	978	846(87%)	837	9	132(13%)	129	3	12(1%)
Trinidad	911	910(99%)	876	34	1(1%)	1	0	34(4%)
Tomales Bay	558	547(98%)	490	57	11(2%)	11	0	57(10%)
Bolinas	2757	2458(89%)	2280	177	299(11%)	262	37	214(8%)
Santa Cruz	1806	1182(65%)	1042	140	624(35%)	541	83	223(12%)
Monterey	1199	898(75%)	799	99	301(25%)	261	40	139(12%)
Morro Bay	514	511(99%)	458	53	3(1%)	3	0	53(10%)
Santa Barbara	695	688(99%)	652	36	7(1%)	7	0	36(5%)
Ensenada	4	4	3	1	0	0	0	1

City, (b) Bolinas-Santa Cruz. However, if collecting between Bolinas and Santa Cruz reveals somewhere a population with reduced occurrence of orange, we may then be justified in regarding Bolinas and Santa Cruz as separate centers. As it appears now, Santa Cruz is the center of high frequency (35%), diminishing at Monterey (25%) to the south and at Bolinas (11%) to the north. Perhaps the 2% of Tomales Bay represents a further northward tapering off from the Santa Cruz center of abundance. Morro Bay and Santa Barbara to the southward are in about the same category as Trinidad and Port Orford, with 1% or less. Whether the four Ensenada specimens are truly indicative of absence of orange, it is impossible to say with such a small series.

The table is also revealing as to albinism, which seems to have no certain correlation with the presence of orange in the aperture. Santa Cruz and Monterey head the list for frequency of albinism (12%). Tomales Bay and Morro Bay are second, with 10%. Then follows Bolinas with 8%, Santa Barbara with 5%, Trinidad with 4%, Crescent City with 1%, and Port Orford with less than 1%. Monterey Bay again appears as the center of abundance of albino specimens. From this center the abundance diminishes to the south and to the north. The greater abundance at Tomales Bay (10%), to the north of Bolinas (8%), may be merely due to the Tomales series being too small a sample.

Illustrating the fortuitous factor in collecting, yet at the same time reinforcing the validity of our percentages, is the case at Santa Cruz. Our total series of 1806 was collected on May 31st (876 specimens), and November 17th (930 specimens). On May 31st the percentages ran as follows: No orange in aperture, 68%; orange in aperture, 32%; albinos, 13%. On November 17th: No orange in aperture, 63%; orange in aperture, 37%; albinos, 12%. The figures presented in the table combine the results for the two days: No orange in aperture, 65%; orange in aperture, 35%; albinos, 12%.

Certain general impressions emerge from viewing large series of the normal colors. From Bolinas northward one gets the impression of drabness in the series, while from Santa Cruz southward the shells in general appear bluer and less drab and gray. Also to the southward the bishop purple appears more conspicu-

ously on the aperture portions of the shells. Southern shells on the whole average smaller than northern ones. The ravages of the parasitic sponge, *Cliona,* which mars shells at Bolinas, was observed nowhere else.

Some albinos at Bolinas have an ivory tone which is largely lacking from Monterey southward and replaced there by a veiled suffusion of purple, which seems to correlate with the greater abundance of this color in the normal colored shells. Indeed, some shells have a suffusion of purple in the parietal callus which is normally white, unless there is a trace of orange or yellow.

Many immature shells of normal color have very thin horn-colored lips (especially true in the north), which is evidently a continuation of the so-called wash of horn color mentioned in the Bolinas article. Another feature of many immature (half-grown or one-third grown) shells is the presence of a dark spot on the parietal wall projecting out slightly from under the upper edge of the lip. In the north (Port Orford to Tomales Bay), this spot is usually maroon, in the south (Bolinas to Santa Barbara) it is usually purple.

The months in which the specimens were collected are as follows: Port Orford, Crescent City, and Trinidad in July, 1941; Tomales Bay in April and August, 1941; Bolinas in November and December, 1940, and January, 1941; Santa Cruz in May and November, 1941; Monterey in May, 1942; Morro Bay in May, 1942; Santa Barbara in June, 1941, and January, 1942; Ensenada in June, 1941.

Very young shells were most abundant in January at Bolinas, in July at Port Orford and less so at Crescent City, but absent at Trinidad. This seems to imply either two breeding seasons, or else a summer breeding season in the north and a winter breeding season in the center (Bolinas) and south. Supporting the latter view was the absence of very young at Morro Bay and Monterey (one exception) in May, and at Tomales Bay in April and August. At Santa Barbara in January, however, five very small young were obtained, again suggesting a winter breeding season. At Santa Cruz we found no very young in either May or November. The very young shells collected at Port Orford were marked with longitudinal wavy brown lines on the ventral surface as at Bolinas (*op. cit.,* p. 12). A unique example of retention of this

infantile character is to be seen in a half-grown shell from Tomales Bay.

Tomales Bay also yielded another unusual specimen. It is an adult, quite brownish-gray in general cast of color. On the body whorl are two encircling parallel gray stripes, each varying from 1 to 2 mm. in width and 3 mm. apart.

At Santa Barbara dark gray shells were more abundant than elsewhere, but were usually only half grown, suggesting a possible fading with age. Two half-grown shells were unusual in possessing a sort of lemon-horn color on the body whorl. Wherever one collects a large series of this beautiful species, unusually colored individuals appear.

Although this paper deals with color variation, we cannot refrain from calling attention to the variation in form which is best expressed by the index derived from dividing maximum diameter by maximum length. We have selected by eye a few extreme examples. The bulk of the specimens lie between these extremes. A low index indicates slimness, a high index obesity. It will be observed that the range in our own random series of eight is from 44 to 60. The individual millimeter measurements and indices follow:

Port Orford, normal color, 27×14, index 52.
Port Orford, normal color, 27×12, index 44.
Tomales Bay, albino, 21×12, index 57.
Tomales Bay, albino, 24.5×12, index 49.
Santa Cruz, orange trace, 21×11, index 52.
Santa Cruz, orange trace, 25×15, index 60.
Morro Bay, normal, 18×10.5, index 58.
Morro Bay, normal, 18.5×9.5, index 51.

DESCRIPTION OF A HELICOID SNAIL FROM MADAGASCAR

By H. A. PILSBRY

About half a century ago I figured a Madagascar shell under the name *Ampelita hemioxia*, in the Manual of Conchology (9: 155, pl. 41, figs. 31–33, July 27, 1894), intending to describe it in this journal. Evidently it passed out of mind. My friend Dr. Jos. Bequaert found the same species, which he identified

by the figures, in the M. C. Z. at Harvard, and he has suggested that I complete the definition of my long-forgotten species.

Ampelita hemioxia Pilsbry, 1894. The depressed shell is openly umbilicate, with low, convexly conoid (or merely convex) spire and carinate periphery, the keel weakening and becoming blunt or somewhat rounded in the last half or third of the last turn; base slightly convex, very bluntly angular around the funnel-shaped umbilicus. Color, tawny-olive above and in the umbilicus, the base paler, nearer honey yellow. The later whorls are somewhat convex in the upper part but become weakly concave near the lower suture and the periphery. Suture not impressed. The surface has a rather weak irregular sculpture of retractive wrinkles of growth and in some places, shallow, indistinct malleation. Under the microscope it shows superficial but rather close spiral striation on the last two whorls, weaker on the base. The indistinctly triangular aperture is strongly oblique, whitish within. Peristome is white, rather narrowly reflected, the basal margin straight, often with a slight convexity within near the foot of the narrow, subvertical, concave columellar lip.

Height 19.2 mm., diameter 39.3 mm.; 4¾ whorls. Type.
Height 19.5 mm., diameter 46.8 mm.; 4¾ whorls.
Height 17.5 mm., diameter 39.7 mm.; 4¾ whorls.
Height 17.2 mm., diameter 37.7 mm.; 4½ whorls. (M.C.Z.)

The figured type and 7 paratypes are 64437 A.N.S.P. In the lot are three dark specimens of carob brown or vandyke brown color, with a lighter, indistinctly defined band around the umbilicus. One or two of the lighter specimens show some brown suffusion. In one specimen the last whorl descends nearly 2 mm. to the aperture, as described for *A. shavi*, but in others there is no descent. The example figured in 1894 happened to be the highest of the lot of 8.

This belongs in a group of closely similar sharply carinate shells comprising *A. novacula* Mts., *A. xystera* Val. and the scarcely different *A. shavi* E. A. Smith, but in *hemioxia* the keel weakens on the latter half of the last whorl.

The Harvard specimen (M.C.Z. 140361) is about typical in color, but the spiral striation is somewhat more clearly engraved.

A NOTE ON THE GENUS ANAPLOCAMUS DALL

By HARALD A. REHDER

Dall, in 1896 (Proc. U. S. Nat. Mus., vol. 18, 1895, pp. 8–9), described a new genus and species, *Anaplocamus borealis*, said to

have been dredged by the U. S. Bureau of Fisheries Steamer ALBATROSS in 61 fathoms south of Unimak Island, Alaska. In his remarks he calls attention to its close resemblance to the fresh-water shell *Anculosa dilatata* Conrad. Both here and in 1902 (Proc. U. S. Nat. Mus., vol. 24, no. 1264, pp. 550–551, pl. 38, fig. 4), he places this form provisionally near *Trichotropis*. In his Summary of the Marine Shellbearing Mollusks of the Northwest Coast of America (Bull. 112, 1921, U. S. Nat. Mus., p. 160), he erects a distinct family for this genus, placing it immediately after the Rissoinidae. Thiele (Handbuch der Syst. Weichtier-kunde, vol. 1, 1929, p. 245) places this family, which he prefaces with a query, after the family Trichotropidae, and most recently Wenz (Handbuch der Paläozoologie, vol. 6, Gastropoda, pt. 4, 1940, p. 896) disposes of it in the same way. The anomalous nature of this species, which has never been found since the original discovery, has on several occasions strongly aroused our attention, and after preparing a radula from the dried-up animal of one of the shells and carefully comparing the shell, operculum, and radula with those of the Anculosae, it is quite clear that we are here dealing with specimens of *Anculosa dilatata* Conrad.

In the collection of the U. S. National Museum there are several lots of *A. dilatata* collected in West Virginia by the U. S. Bureau of Fisheries at approximately the same time when the specimens of *Anaplocamus* were supposed to have been dredged. With these, the specimens from the type lot of *Anaplocamus borealis* agree very closely in general appearance. Undoubtedly a mix-up in locality labels is to blame for this unusual state of affairs. The generic name, therefore, may be used for this group of somewhat atypical Anculosae, whose claim to valid distinctness awaits closer anatomical study. This note calls attention to the availability of the name for these fresh-water forms, and to the fact that the family Anaplocamidae, and the name *Anaplocamus borealis* Dall, are to be stricken from the rolls of marine mollusks.

UINTA MOUNTAIN MOLLUSKS

By JACK WOOLSTENHULME
Sec. Lieut., U. S. Marine Corps[1]

The following collections from the Uinta Mountains of Utah and vicinity were made in 1939–41. Earlier records from this

[1] Home address: Kamas, Utah. Graduate assistant (on leave of absence), Biology Dept. University of Utah.

area were published in a previous report (Woolstenhulme, J., May 20, 1942. New records of Mollusca. Bull. U. of Utah, Vol. 32, No. 11—Biol. Ser., Vol. 6, No. 9—pp. 3–14). This study represents a preliminary printing of a portion of the material for the Master's thesis at the University of Utah, prepublished because of interruption of my graduate work by call to active duty in the U. S. Marine Corps.

I wish to thank Dr. R. V. Chamberlin, head of the Biology Department, for facilities, for financial aid, and for permission to prepublish this material; also my graduate committee, Dr. David T. Jones, chairman; Calvin Riehins, who served as chairman the first year; Dr. William Behle; and Dr. Seville Flowers, for guidance, constructive criticism, and for approval of the above prepublication plan; and again, Dr. Jones, who, after my call to the service, aided in condensing the material into the present form.

The Uinta Mountains are unique, not only as the highest mountains in the State of Utah, but as one of the few east-west ranges in the western United States. Their present configuration, especially in regard to the numerous lakes, is a result of Pleistocene and recent glaciation. The Uinta Mountains have been quite inaccessible, and parts are yet unexplored. The road through Kamas has for several years been one of the main approaches to the region. Ecological notes are withheld for the present, that here a systematic list of species may be presented, which reports all my collecting to date. Duplicates of some of the species are being deposited in the molluscan collections of the Museum of Invertebrate Zoology of the University of Utah.

In order to conserve space, all localities, in alphabetic order, are numbered in parentheses as below. Subsequent to this list the number of the locality alone will be used. (1) Beaver Creek Canyon, Kamas, Utah; (2) Center Canyon, ten miles up Daniel's Canyon, Heber City, Utah; (3) Chalk Creek, twelve miles east of Coalville; (4) Daniel's Canyon, Utah; (5) Daniel's Canyon, five miles from Heber City, Utah; (6) Daniel's Canyon, head of canyon; (7) Duchesne, Utah, stream one mile west of town; (8) Duchesne, Utah, stream three miles north of town; (9) Duchesne, Utah, three miles west of town; (10) Echo, Utah, two miles east of town; (11) Echo Canyon, five miles east of Echo, Utah; (12) Echo Canyon, ten miles east of Echo; (13) Echo Canyon, twenty

miles east of Echo; (14) Echo Reservoir, east side, two miles north of Coalville; (15) Evanston, Wyoming, three miles west of town; (16) Evanston, Wyoming, one mile west of town; (17) Evanston, Wyoming, one mile east of town; (18) Francis, Utah, two miles west of Francis; (19) Francis, Utah, two miles west of Francis, in spring along Provo River; (20) Hayden's Pass, Uinta Mountains, Utah, elevation 10,500 ft.; (21) Hayden's Peak, west slope, elevation 11,000 ft.; (22) Heber City, two miles north of town; (23) Heber City, three miles east of town; (24) Hoyt's Canyon, two miles east of Oakley, Utah; (25) Indian Hollow, two miles west of Kamas; (26) Kamas, Utah; (27) Kamas, Utah, two miles west of town; (28) Kamas, Utah, six miles east of Kamas; (29) Kamas, Utah, eleven miles north of Kamas; (30) Kamas, Utah, mouth of Beaver Creek Canyon; (31) Kamas, Utah, diversion canal, one mile north of town; (32) Maxwell Spring, Beaver Creek Canyon, Kamas, Utah; (33) Mirror Lake, meadow three miles east of the lake, Kamas, Utah; (34) Red Pine Canyon, Uinta Mountains, Kamas, Utah; (35) Roosevelt, Utah; (36) Roosevelt, Utah, stream west of town; (37) Roosevelt, Utah, stream midway between Roosevelt and Ft. Duchesne, Utah; (38) Roosevelt, Utah, swamp, five miles west of town; (39) Smith-Morehouse Canyon, Weber Canyon, eleven miles east of Oakley, Utah; (40) Strawberry Reservoir, Utah; (41) Strawberry Reservoir, stream along highway, two miles west of reservoir; (42) Vernal, Utah, three miles north of town; (43) Weber Canyon at Oakley, Utah; (44) Weber River, one mile west of Oakley, Utah; and (45) Woodland, Utah, Bench Creek.

The list of species is systematically, instead of alphabetically, arranged. I regard the new record of *Radix auricularia* (L.)[2] as one of the outstanding records of the list. In second place, I should rate the record of *Orcohelix peripherica weberiana* Pils. In the list below the locality is first given by number in parentheses, then the date, and finally the number of specimens. Semicolons appear between each record.

Systematic List of Species

Margaritifera margaritifera (Linn.). (26), Jul. 16, 1939, several.

Musculium truncatum (Linsley). (45), Sept. 5, 1940, two adults; (33), Sept. 13, 1941, one.

[2] Since the author's enlistment some controversy has arisen over *Radix auricularia* (cf. Frank C. Baker, Naut., Vol. 55, No. 3, pp. 105–106, Jan. 1942) which may require further checking of this record.—David T. Jones.

Musculium uintaense (Call). (18), Oct. 19, 1941, two; (33), Sept. 13, 1941, seven; (25), Oct. 4, 1941, four; (26), Sept. 6, 1940, one; (45), Sept. 5, 1940, five.

Pisidium abditum Haldeman. (13), Oct. 24, 1941, three; (41), Nov. 10, 1941, one; (20), Sept. 13, 1941, one; (32), Jul. 15, 1939, two; (26), Sept. 6, 1940, two.

Pisidium compressum Prime. (26), Sept. 6, 1940, one.

Pisidium variabile Prime. (39), Sept. 17, 1939, two; (26), June 12, 1939, several; (32), July 15, 1939, one; (27), Aug. 24, 1939, two.

Vallonia pulchella (Müller). (1), Aug. 31, 1939, several.

Vallonia albula Sterki. (24), Oct. 10, 1941, four; (29), Nov. 4, 1939, five (D. Mulaik); (39), June 18, 1940, four.

Vallonia gracilicosta Reinhardt. (2), Nov. 9, 1941, ten.

Oreohelix periperica weberiana Pilsbry. (14), Oct. 11, 1941, four.

Oreohelix strigosa depressa (Cockerell). (14), Oct. 11, 1941, eight; (12), Oct. 24, 1941, four; (19), Nov. 9, 1941, nine; (23), Nov. 1, 1941, five; (5), Oct. 10, 1940, four; (21), Aug. 6, 1941, two; (39), Sept. 2, 1939, four (high-spired); (34), July 5, 1939, two.

Microphysula ingersolli (Bland). (39), Sept. 17, 1939, one; (24), Oct. 10, 1941, one; (6), Nov. 10, 1941, three.

Pupilla blandi Morse. (45), Sept. 5, 1940, one; (39), June 18, 1940, five; (29), Nov. 4, 1939, two (D. Mulaik); (26), Sept. 20, 1939, one (seven whorls); (24), Oct. 10, 1941, three; (13), Oct. 24, 1941, two; (6), Nov. 10, 1941, one; (2), Nov. 9, 1941, three (six and a half whorls).

Vertigo modesta parietalis (Ancey). (33), Sept. 13, 1941, two.

Cochlicopa lubrica (Müller). (45), Sept. 5, 1940, one.

Vitrina alaskana Dall. (28), Oct. 20, 1940, one (S. and D. Mulaik); (29), Nov. 4, 1939, six (D. Mulaik); (4), Oct. 15, 1939 (Stanley Mulaik); (39), June 18, 1940, one; (32), Sept. 20, 1939, two; (45), Sept. 5, 1940, four; (6), Nov. 10, 1941, seven; (13), Oct. 24, 1941, two; (33) Sept. 13, one.

Euconulus fulvus alaskensis (Pilsbry). (6), Nov. 10, 1941, three; (24), Oct. 10, 1941, four; (45), Sept. 5, 1940, two; (39), June 18, 1940, one; (26), Sept. 20, 1939, two.

Zonitoides nitidus (Müller). (45), Sept. 5, 1940, four; (26), Sept. 6, 1940, four.

Zonitoides arboreus (Say). (29), Nov. 4, 1939; two (D. Mulaik); (28), Oct. 20, 1940, five (S. and D. Mulaik); (39), June 18, 1940, three; (26), Sept. 6, 1940, fourteen; (4), Oct. 15, 1939 (S. Mulaik); (24), Oct. 10, 1941, two.

Deroceras agreste (Müll.) (26), Sept. 20, 1939, several.

Deroceras gracile Raf. (26), Sept. 6, 1940; several; (35), Nov. 9, 1941, ten.

Discus cronkhitei (Newcomb). (45), Sept. 5, 1940, two; (26), Sept. 6, 1940, five; (39), June 18, 1940, two; (14), Oct. 11, 1941, four.

Discus cronkhitei anthonyi Pilsbry. (6), Nov. 10, 1941, four; (24), Oct. 10, 1941, one; (45), Sept. 15, 1940, five; (39), Sept. 17, 1939, one; (28), Oct. 20, 1940, one (S. and D. Mulaik); (30), Jul. 2, 1939, several.

Punctum pygmaeum Draparnaud. (33), Sept. 13, 1941, one; (26), Sept. 6, 1940, several.

Succinea avara Say. (26), Sept. 6, 1940, several; (16), Oct. 24, 1941, one; (13), Oct. 24, 1941, three; (14), Oct. 11, 1941, six (lymnoid form).

Radix auricularia (Linn.). (19), Oct. 19, 1941, several.

Stagnicola caperata (Say). (32), Sept. 20, 1939, two; (8), Nov. 9, 1941, two; (23), Nov. 1, 1941, seven.

Stagnicola palustris nuttalliana (Lea). (44), Oct. 19, 1941, ten; (36), Nov. 9, 1941, eleven; (3), Oct. 11, 1941, three; (22), Nov. 9, 1941, nine; (37), Nov. 9, 1941, one; (41), Nov. 10, 1941, one (small); (19), Oct. 19, 1941, three; (14), Oct. 11, 1941, three; (17), Oct. 24, 1941, several; (40), Oct. 5, 1940, three; (31), Apr. 7, 1939, three; (45), Sept. 5, 1940, one; (8), Oct. 5, 1940, one.

Fossaria obrussa (Say). (15), Oct. 24, 1941, one; (13), Oct. 24, 1941, one.

Helisoma trivolvis trivolvis (Say). (14), Oct. 11, 1941, six.

Gyraulus parvus Say. (38), Nov. 9, 1941, ten.

Gyraulus vermicularis (Gould). (10), Oct. 24, 1941, one; (14), Oct. 11, 1941, one; (13), Oct. 24, 1941, two; (40), Oct. 5, 1941, several.

Physa ampullacea (Gould). (45), Sept. 5, 1940, several; (40), Oct. 5, 1940, one; (32), Sept. 20, 1939, four; (9), Oct. 5, 1940, six; (42), Oct. 5, 1940, several; (19), Oct. 19, 1941, ten; (16), Oct. 24, 1941, two; (25), Oct. 4, 1941, five; (23), Nov. 1, 1941, several; (37), Nov. 9, 1941, one; (14), Oct. 11, 1941, two; (13), Oct. 24, 1941, five.

Physa virgata (Gould). (14), Oct. 11, 1941, one; (40), Oct. 5, 1940, three.

Paludestrina longinqua (Gould). (7), Nov. 9, 1941, five; (11), Oct. 24, 1941, four; (2), Nov. 9, 1941, several; (37), Nov. 9, 1941, one; (26), Apr. 7, 1939, several; (43), Apr. 7, 1939, one.

Valvata humeralis californica Pilsbry. (40), Oct. 5, 1940, several.

HELICODISCUS IN THE WEST INDIES

By H. A. PILSBRY

This genus of land snails, widely spread in continental North America, has only quite recently been known from the West Indies. Dr. C. G. Aguayo[1] in 1935 reported an undetermined Cuban species from Rejondón de Báguanos, Holguin. Years ago my friend Charles T. Ramsden sent two specimens of a species somewhat resembling *H. singleyanus* and *H. nummus,* from Oriente Province. I give myself the pleasure of naming it for him.

Helicodiscus ramsdeni, new species. Fig. 1a.

Guaso River at confluence with Jaibo River, Guantánamo, Cuba. Type and paratype 46706 A.N.S.P., collected by Charles T. Ramsden, 1914.

The minute shell is subdiscoidal, broadly umbilicate, the umbilicus contained about 3⅔ times in the diameter, the spire slightly convex; whorls very slowly increasing. The surface is glossy, closely and distinctly striate, and with many impressed spiral lines about as widely spaced as the striae. Aperture lunate, wider than in the *H. parallelus* group, about as in *H. singleyanus.* Lip simple. No internal teeth seen. Height 0.8 mm., diameter 1.6 mm.; 3¾ whorls.

[1] Mem. Soc. Cubana Hist. Nat. "Felipe Poey," 9: 123.

Two bleached specimens of nearly the same size were found in mud from the river bottom. It is apparently a member of the subgenus *Hebetodiscus,* differing from *H. singleyanus* by the decidedly stronger striation and especially by the distinct, evenly spaced spiral lines.

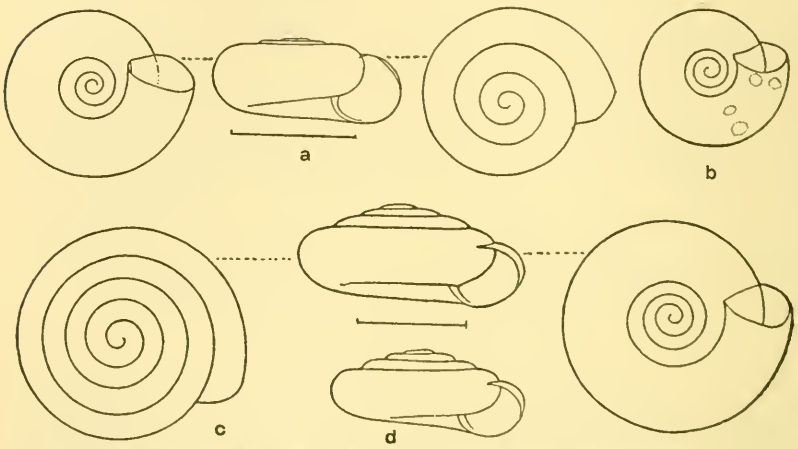


Fig. 1, a, *Helicodiscus ramsdeni.* b, *Helicodiscus apex,* immature. c, d, the same, adult lectotype and paratype. Scale lines = 1 mm.

HELICODISCUS APEX (C. B. Adams). Figs. 1b, c, d.

Many years ago Professor C. B. Adams found a minute shell in Jamaica which he called *Helix apex.*[2] This was dumped into the synonymy of *Helix* (now *Hawaiia*) *minuscula,* which is a larger striate shell with decidedly larger aperture and otherwise different. But the type lot in the Amherst collection, 33 specimens, demonstrates its true place in the system, so far as possible without examination of the soft anatomy. It has waited nearly a century to be herded into its proper family and genus.

It is a small species, height 0.9 mm., diameter 2.1 mm., of scant 5 whorls, having the translucence and color and the smooth surface of *H. singleyanus,* and toothless in the adult stage; but several young ones of about 1 to 1.2 mm. diameter have two pairs of internal teeth situated as in typical *Helicodiscus,* as in fig. 1b. It is thus a connecting link, having the teeth of *Helicodiscus*

[2] Contributions to Conchology No. 3, p. 36; no. 4, p. 52. 1849.

proper, in the immature stage, and the size, texture and color of the subgenus *Hebetodiscus*.

Where in Jamaica Adams picked these shells up is unknown. He rarely gave localities for his Jamaican shells, but later collections have supplied them for most of the larger species. It is one of the Jamaican minutiae still to be rediscovered.

A NEW SUBSPECIES OF HALIOTIS (H. FULGENS TURVERI)

By PAUL BARTSCH

During the cruise of the Albatross in 1911, which extended from San Diego to the head of the Gulf of California, I collected a specimen of a *Haliotis* belonging to the *fulgens* group (U.S.N.M. No. 464211), in Santa Maria Bay, which was badly worn but much more elevated than the typical race.

Recently Mr. A. Sorensen secured some specimens from Magdalena Bay, which is nearby, which makes it necessary to recognize the southern race as a distinct subspecies. This is readily distinguished from the typical race by being much more elevated.

The type, U.S.N.M. No. 508764, presented by Mr. A. Sorensen, measures: Height, 68 mm.; greater diameter, 173 mm.; lesser diameter, 140 mm. The type has 3 breathing apertures; my specimen has 5.

The southern race is much more heavily eroded and encrusted than those from the northern region.

I take pleasure in naming this race for H. R. Turver, Director of the Santa Cruz Museum of Natural History, who accompanied Mr. Sorensen on his trip to the Gulf.

NOTES ON THE MARINE MOLLUSKS OF CAPE ANN, MASSACHUSETTS

By RALPH W. DEXTER
Kent State University, Kent, Ohio

During the summer months of 1933–37 and for brief periods in 1938 and 1940 the writer was engaged in ecological studies on the marine communities at Cape Ann, Massachusetts. Reports on these communities are in process of preparation for publication. Because several malacologists and others have shown interest and have made inquiries concerning the molluscan species found in

the tidal and subtidal communities of this region, it seems desirable to present at this time, a separate list of the mollusks with a few notes concerning the distribution and abundance of each. Collections were made on the intertidal zone by hand picking and by means of a clam fork, while a naturalist's dredge was used for subtidal collecting. Intensive collecting took place along and in a tidal inlet known as the Annisquam River. Numerous dredgings have been made in Ipswich Bay, several in Sandy Bay, and one series of dredgings made along the eastern coast of Cape Ann and in Gloucester Harbor.

I. AMPHINEURA

Neomenia sp. Numerous specimens dredged in Ipswich Bay.

Chaetopleura apiculata Say. Several specimens dredged in Sandy Bay.

II. GASTROPODA

Onchidoris bilamellata (L.). Dredged in the tidal inlet and occasionally found under flat stones along spring low water line.

Aeolis sp. Several dredged in the inlet.

Melampus bidentatus Say. Common in the high fox-grass (*Spartina patens*) marshes. Often found in small groups under solid objects. Occasionally found in upper margin of the thatch grass (*Spartina glabra*) marsh.

Acmaea testudinalis. Found on intertidal and subtidal rocks, shells, mussels, hermit crabs, in the deeper waters of the bays as well as in the inlet.

Polinices heros (Say). Common on all mud and sand beaches and bars, on bottom of inlet and in the bays.

Crepidula fornicata (L.). Many specimens on rocks and mussel beds in subtidal waters and along low water line.

Crepidula plana Say. Commonly found as a commensal with hermit crabs (*Pagurus* spp.). Collected in submerged tidal zone, in pools, and in subtidal region of inlet and bays.

Littorina litorea (L.). Found abundantly in every habitat and community. Most numerous along lower half of the intertidal zone. Dredged from inlet and bays. Found in small brackish estuaries of nearly fresh water and above high water line.

Littorina saxatilis Olivi (commonly known as *L. rudis* Maton). Abundant after 1934 on rocky shores near and above high water

line and on and among marsh grasses, particularly *Spartina glabra*. Occasionally swarm on the mud of marsh creeks. Few specimens, which were probably washed down, were dredged in the inlet. Remarkable fluctuation in abundance observed.

Littorina obtusata L. (commonly known as *L. palliata* Say). Abundant on seaweeds attached to intertidal rocks and among marsh grass in the low, thatch grass marshes.

Lacuna vincta (Montagu). Commonly collected on subtidal algae, particularly brown algae, in the inlet and in all bays. Very scarce, however, in 1935.

Rissoa aculeus (Gould). Abundant on mud, firm sand, and among mats of the green alga *Chaetomorpha linum*. Few specimens were dredged from the inlet.

Skenea planorbis (Fabricius). One shell found among sea wrack cast along inlet.

Aporrhais occidentalis Beek. One shell found on Wingersheek Beach bordering Annisquam Harbor.

Thais lapillus (L.). After 1936 common on barnacle-covered rocks and mussel beds. Few specimens, probably washed down, collected while dredging inlet. This species was scarce for several years preceding 1936.

Nassa trivittata (Say). Common on sand and mud bottoms of inlet and bays. Few specimens collected on mussel beds near mean low water line.

Nassa obsoleta (Say). Abundant on soft, black mud; found in large discontinuous groups, especially in marsh creeks. A few specimens penetrate into lower margin of the marshes.

Buccinum undatum L. A number were dredged from Ipswich Bay.

Neptunea decemcostata (Say). Several dredged from Ipswich Bay.

Colus stimpsoni Mörch. Several dredged from Ipswich Bay.

III. Pelecypoda

Solemya velum Say. Numerous in all intertidal sand and mud flats and bars.

Solemya borealis Totten. One shell found at Wingersheek Beach.

Anomia aculeata L. Dredged in small numbers from river

bottom and from all the bays. Two specimens were found on a rock among intertidal boulders bordering Annisquam Harbor in 1933. While these may have been washed in, that did not appear to be the case because of their natural position. Ordinarily this species is found below one fathom.

Mytilus edulis L. Widely distributed and abundant, forming mussel beds and colonies over flats and among rocks; common in crevices and around bases of rocks. Also common among thatch grass. Many specimens, chiefly small ones and seed, dredged from river bottom and from all bays. The variety *pellucidus* was often found among the others, on the intertidal mussel beds particularly.

Modiolus modiolus (L.). A few specimens were found at Spring low water line among the rocks on the northern shore of Gloucester Harbor and among the rocks on the eastern shore of Annisquam Harbor. Several were dredged in Ipswich Bay and in Sandy Bay.

Modiolus demissus (Dillwyn). Common in low thatch marshes of *Spartina glabra,* especially on margins of marsh creeks. Occasionally extend out into mud flats and rarely in crevices of rocks.

Modiolaria nigra (Gray). One shell found on shore of Gloucester Harbor.

Astarte castanea (Say). Few shells dredged in Sandy Bay.

Venericardia borealis Conrad. Few shells dredged in Sandy Bay.

Arctica islandica (L.). A number of specimens dredged in Ipswich Bay and Sandy Bay.

Lucina filosa Stimpson. A few specimens collected from mud flats.

Cardium pinnulatum Conrad. Several dredged from the inlet and a few from Sandy Bay.

Spisula solidissima Dillwyn. Many collected in sand at spring low water line at Wingersheek Beach bordering Ipswich Bay.

Mactra lateralis Say. Numerous in a sand bar of the inlet.

Venus mercenaria L. A number collected in sand at spring low water on Annisquam beaches.

Gemma gemma (Totten). Abundant on sand, mud and among mats of the green alga *Chaetomorpha linum.* Occasionally in the lower margin of thatch marshes. Many dredged from inlet.

Callocardia convexa Say. A number of shells collected on Wingersheek beach.

Petricola pholadiformis (Lam.). Several specimens dug from a sandy-mud bar.

Tellina tenera Say. A number dredged from soft, clay bottom of the inlet.

Macoma balthica (L.). Widely distributed and common in mud and sand beaches and bars.

Ensis directus Conrad. Widely distributed and common in mud and sand and occasionally dredged from channel.

Siliqua costata (Say). Many collected in sand bar of inlet.

Mya arenaria L. Widely distributed, and except for 1934, abundant in all mud and sand sediments. Sometimes found in low marshes. Seed collected on mussel beds and dredged from river bottom and Ipswich Bay.

Saxicava arctica (L.). Common in holdfasts of *Laminaria* spp. and often among blue mussels along low water line. Dredged from inlet and all bays, especially in holdfasts.

Cyrtodaria siliqua (Spengler). One shell dredged from Sandy Bay.

Teredo navalis L. One colony found in drift wood along shore of inlet.

Xylophaga sp. Several specimens in water-logged stem dredged from inlet.

Cochlodesma leanum (Conrad). Several shells collected at Wingersheek beach by Mrs. Frances Beardslee.

Lyonsia hyalina (Conrad). Two specimens collected along low water line, one attached to group of mussels, one in sandy-mud; several dredged from inlet.

IV. Cephalopoda

Loligo pealei Lesueur. Observed in shallow water of inlet. Some found stranded on marshes following spring tides.

MESODON APPRESSUS (SAY) IN MARION COUNTY, INDIANA

By GLENN R. WEBB

On October 26, 1941, a colony of *Mesodon appressus* (Say) was found in southwestern Center Township, Marion County, Indiana

along the east bank of White River (West fork) in the region of the Harding Street Bridge.[1] Aside from a scattering of specimens eastwards of the bridge-head, the colony is as yet confined to the southwest corner of Harding Street and the River on and about weed-covered, man-made gravel hills. Specimens are least plentiful on the more nearly level areas adjacent to the hills. Another group of hills, less than 500 feet distant, are as yet uncolonized by *appressus* although other species occur there. The present extent of the colony is about that of a moderate sized city lot.

A rough estimate of the relative abundance of *appressus* and of the larger species associated with it was determined in the course of 2–3 hours of collecting in the most favorable part of the colonized area—the extreme NW hill—after heavy rains. On this occasion every living snail encountered (exclusive of the minute species) was collected. Expressing the abundance of each species as a percentage of the 469 snails obtained, their relative abundances are as follows: *Anguispira alternata* (Say) 62.26%, *Mesodon appressus* (Say) 29.63%, *Mesodon elevatus* (Say) 4.05%, *Succinea avara* Say 2.77%, and *Mesodon clausus* (Say) 1.27%.

So far as I know, the closest point at which *appressus* occurs indigenously is about 54 miles distant.[2] It would thus seem that the Marion County colony has resulted from a chance introduction of specimens. Spring collecting (1942) reveals the colony to have survived the winter unharmed. The subsequent history of the colony should prove interesting.

Specimens have been deposited in the collections of the Academy of Natural Sciences of Philadelphia. In making the identification, the genitalia of about a dozen specimens were examined.

NEW FLORIDAN MARINE MOLLUSKS

By JEANNE S. SCHWENGEL

Lamellaria leucosphaera, new species. Nautilus 56, Pl. 3, figs. 8.

Shell naticoid, thin, transparent, with a slight milky cloudi-

[1] Loc. H + 4 –.

[2] 1929. Cahn, A. R. and Kemp, J. T., "The Terrestrial Mollusca of Turkey Run State Park, Indiana." Naut. 43(2) pp. 66–68.

ness, smooth, shining and faintly iridescent. Nucleus very small, flat and glassy, of about 1¼ whorls, followed by two abruptly larger, convex whorls. Suture impressed. Sculpture of fine incremental lines. Aperture broad, ovate, nearly two-thirds the size of the shell. Columella concave, spirally gyrate, allowing a view up the spire from the base of the shell. Length 16 mm., breadth 15 mm., thickness 11 mm.

Dredged by Carl S. and Alice D. Miner, in about 1½ to 2 fathoms in Pine Island Sound, off Red Fish Pass, Captiva, Florida. Type A.N.S.P. No. 178718.

This shell is very similar in form and size to *Marsenina globosa* Perry, but the shell is completely enclosed in the mantle, has no fine microscopic revolving threads as has *M. globosa,* is not quite so globose, the next-to-last and body whorls being more oblique and the spire being a little more produced.

The following description of the animal was made from a living aquarium specimen observed closely over a period of days by Louise M. Perry. Thanks and appreciation are accorded her.

"Length 20 mm., width 15 mm., height at center 16 mm. In external appearance the animal is grayish, jelly-like, oval in outline, gently and symmetrically rounded to a central, elevated summit where the shell is visible through the semi-transparent mantle. The mantle completely covers the body and the shell, whose apex is seen posteriorly at the right. Structural details of the dark liver are visible through mantle and shell.

"The mantle is grayish, semi-transparent; its free edges are thin and delicate, rounded behind, slightly 'frilled' at the sides where there are three indentations or slits. These slits may be deepened by contraction of the body of the mantle. Directly in front the mantle has a deep central fissure whose edges are folded and reflected to form a siphonal canal which is directed forward and upward at an angle near 25 degrees. This siphonal canal can be lengthened or shortened and widened.

"The outer surface of the mantle is peppered with small black dots tending to circular grouping and surrounded by numerous granular appearing, refractile, white 'sugar grains.' Less numerous and irregularly placed are clusters of these dots conically elevated above the general surface level. The free edges of the mantle are thickly covered with minute pin dots like fine sugar crystals, slightly refractile, as are those over the body of the mantle. The dots are entirely absent from the mantle's inner surface. Under low magnification the entire surface of the mantle

appears finely granular throughout its thickness. Its whole surface is sensitive to touch.

"There seems to be no distinctly separate head. Two tentacles are present, about 3 mm. long, bluntly pointed and carried well apart like the horns of a Texas 'longhorn.' The eyes are brilliant black, set in bulbous enlargements near the outer sides of the bases of the tentacles.

"The foot is elongate, oval, somewhat squared at the anterior extremity forming corners which can be turned inward for use as clasping processes. Also the entire extent of the lateral borders of the foot can be reflected over the plantar surface and used as clasps.

"The creature creeps sluggishly, and can sustain itself in a reversed position beneath the surface film."

PTERIA XANTHIA, new species. NAUTILUS 56: Pl. 3, figs. 1, 1a.

The shell is obliquely ovate, of fragile, horny texture, of a light cadmium color. The rays of scales are strongly developed, but are more or less worn off except on the lower third of valve. The anterior wing is very thickly laminate, almost forming a frill, but thinning to about eight rays thereafter on the left valve. The laminations on the seventh ray are much wider and longer, about 12 mm., and are in exact prolongation of the convexity from umbo to posterior margin, looking very much like the tail of a fish; this illusion being carried out by the laminations on the tip of the posterior wing, where they are again longer and heavier, turning slightly upward and looking like a dorsal fin. These rays of laminations or scales are much more frequent on the right valve than on the left, having smaller and intermediate rays between each of the heavier rays. The rounded umbones are at about the anterior fourth, and do not project above the cardinal margin, which is straight except at the tip of the posterior wing, where it turns obliquely upward. The byssal notch is much larger than in most pterias, taking practically all of the anterior wing space on the right valve. The interior of the valves is macreous, ending in a distinct line a short distance from the free margins. Length 35 mm., height 18 mm. (exclusive of the projecting scales.)

The Type, 178717 A.N.S.P., was dredged off Captive Island, Florida, by Alice D. Miner, in December 1941.

This shell has been compared with *Pteria vitrea* Reeve, which it most nearly resembles, though it is not as oblique, the color is yellow instead of opaque white, and the laminations are much longer, though not as profuse as in *P. vitrea* Reeve.

TEREBRA GLOSSEMA, new species. Pl. 6, fig. 3.

Shell elongate, apex very minute but rounded, consisting of 1½ smooth, faintly pink whorls, followed by 14 slightly convex whorls; milk-white, tapering regularly from base to apex. Axial sculpture of small, retractively curved ribs, scarcely equal to their intervals, 27 on the last whorl. Spiral sculpture begins so faintly on early whorls as to be undiscernible except through a lens, but gradually strengthens into 5 or 6 unevenly spaced, squarely cut linear grooves, a much wider groove defining the sutural fasciole. Microscopic spiral lines appear between the grooves on the last three whorls. These grooves do not completely cut the summits of the ribs, thereby retaining the continuity of ribs from apex to base. Aperture small, columella smooth and recurved into the deeply channelled notch, siphonal fasciole convex.

Length 24 mm., width 6 mm.; length of aperture, 5 mm., width 2 mm.

Dredged in 7 to 8 fms. off Pelican Shoal, Florida Keys, by the author and Ted Dranga in April, 1939. Type 175131 A.N.S.P. It was illustrated in THE NAUTILUS, Vol. 53, No. 3, January, 1940, plate 12, fig. 14.

T. glossema, taken in the dredging off Sanibel in 1941, shows the first 8 or 9 whorls of ochraceous buff, with a paler band on the next to the last whorl and on the base.

TRITIARIA (ANTILLOPHOS) VIRGINIAE, new species. Plate 3, figs. 6, 7.

Shell medium-sized, moderately slender, with 3½ nuclear whorls, the last 1½ bearing a sub-basal spiral keel, which gradually lowers until it disappears in the suture. The last third of the apex bears 4 or 5 widely spaced, curved, axial ribs. Six rounded whorls follow, with a well defined suture and sculptured with two spiral ridges on first whorl, three to four on the second, increasing to five on succeeding whorls and ending with from 14 to 16 on body-whorl, with one and sometimes two faint ridges, the first heavier than the second, in intervals between spiral ridges. The entire shell is covered with small axial ribs, unevenly spaced, interspersed with heavier varix-like ribs, forming nodules where these ribs cross the spirals. There are between 22 and 26 axial ribs on the body whorl. The color is light buff with faint cinnamon-buff splotches on the earlier whorls, which develop into three faint bands on the body-whorl, the cinnamon-buff on three spiral ridges

forming the first two bands and on six spirals for the third or anterior band. Aperture long-oval, white and shining. Canal deep, but little recurved, externally with a convex, but low siphonal fasciole. There are ten strong lirae within the outer lip, ending about 1½ mm. from edge of lip. Columella bears a basal fold, above which are four irregular denticles. Parietal wall bears a spiral ridge, slightly above the middle. The posterior angle of the aperture has a slight callus. Near the base of the outer lip there is a shallow stromboid notch. The spiral ridges crenulate the edge of the outer lip.

Length 24 mm., width 10½ mm. Length of aperture 12½ mm.
Length 22 mm., width 9½ mm. Length of aperture 11½ mm.

Dredged at 65 fms. off Palm Beach. Florida. Type 178716 A.N.S.P.

PHOS(?) ADELUS new species. Plate 3, fig. 4.

The small shell of 8 whorls is almost half as wide as long. The apex is blunt, the 2½ embryonic whorls smooth, turned in at the tip. The 6 following whorls are well rounded, suture distinct, beginning with 8 longitudinal rounded ribs on first whorl, 9 on the second, 10 on the third and fourth, and 13 on the 5th and body-whorl, with spaces between each rib equalling width of rib, except behind varix near lip, where space is half again as wide. The entire shell is covered with alternate heavy and light revolving elevated lines, continuous over the ribs. There are 5 heavier lines over basal concavity, which are slightly granose where the longitudinal ribs fade out. The lines become again smaller upon the siphonal fasciole. The incremental lines are quite distinct, giving a faint reticulated appearance to the surface of the shell. The color is pale pinkish-buff with orange-cinnamon irregular markings over the ribs, forming a faint band over the upper portion of each whorl. Aperture elliptical, a lamellar ridge on parietal wall forming a distinct posterior sinus. Below this ridge are several thickened folds in the callus. Columella bears a strong basal fold below which is the short, deep canal. There are 14 strong lirae within the outer lip, which has a crenulated edge. The first and the fourteenth lirae are heavier. The first is opposite the ridge on parietal wall and the fourteenth is opposite the basal columellar fold. Length 16½ mm. Breadth 8½ mm. Length of aperture 8¼ mm.

Locality: Puerto Plata, Dominican Republic. Type 178477 A.N.S.P.

NOTES AND NEWS

Dr. Charles Davies Sherborn.—All naturalists concerned with taxonomy will hear with deep regret of the death of Dr. Sherborn on June 22, within a week of his eighty-first birthday. He was the author of papers on paleontology as well as on nomenclature, but his great *Index Animalium*, covering all systematic names from 1758 to 1850, is his lasting memorial.

The Symposium on Methods of Collecting was a valuable feature of the Maine meeting A. M. U. 250 copies of these papers have been printed, and can now be obtained from the Secretary A. M. U., Mrs. Harold R. Robertson, Buffalo Museum of Science, Buffalo, N. Y. The price is 25¢.

A Collection of mollusks, from waters all over the world, has been added to the department of zoology of Field Museum of Natural History. It includes more than 100,000 specimens of shells, accumulated during a period of some forty years by Walter F. Webb, of Rochester, N. Y. The collection was acquired through the interest of Stanley Field, president of the museum. According to Dr. Fritz Haas, curator of lower invertebrates, the permanent scientific value of the collection is enhanced by the fact that it includes other important private collections which Mr. Webb had purchased in Europe and America, some of them dating as far back as the eighteen-sixties. (*Science.*)

The Buffalo Museum of Science announces that Imogene C. Robertson was made Research Associate in Malacology, the appointment effective July 1 when she retired after fifteen years' service on the Staff. Mrs. Robertson was Curator of Biology, Registrar, and Scientific Editor. She has brought the Museum and its work to national attention by serving as Financial Secretary of the American Malacological Union, a position to which she has been reelected annually since its organization in 1931. The Board passed a resolution expressing keen appreciation of her work and regret at her retirement.

J. W. Jones, member of the American Malacological Union, and father of Dr. David T. Jones of the University of Utah, died of

cerebral hemorrhage on May 10th, 1942, at the age of 80 years. A native of Ohio, he was much interested in the larger land snails of that area, particularly of the family Polygyridae. He attended the first meeting of the American Malacological Union at Philadelphia, where he became acquainted with many members. His burial was in the Mt. Auburn Cemetery, near his home at Vinton, Iowa.

THE MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA are occasionally mimeographed and sent to those who are too far away to attend the meetings. And how it lightens the heart to be taken into their genial company, even at this distance! It is suggested that anyone desiring to receive copies of the Minutes should send some 1½ cent stamps, to pay postage, to the Secretary, Effie M. Clark, 403 S. Mariposa St., Los Angeles.

HUGH C. FULTON, the well-known English conchologist and dealer, passed away on May 11th, 1942. His widow, Mrs. Weena C. Fulton, is carrying on the firm at the same address, 2 Florence Road, Ealing, London W. 5, England.

XYLOPHAGA ATLANTICA, new species. Plate 6; fig. 4.—Shell globular with a conspicuous transverse furrow, gaping in front and closed behind. Posterior portion of the shell rather smooth with faint irregular concentric lines. Anterior to the furrow and parallel to it are some conspicuous ridges. Anterior margin of the shell reflected and covered by two small accessory valves on which there are conspicuous ridges approximately at right angles to the ridges parallel to the furrow. *Dimensions:* length 11.0 mm.; width 11.0 mm.

Locality: from drift wood "East Coast of United States." Type 178741 A.N.S.P. Paratype Newark Museum.

Larger than *X. dorsalis* Turton and with a more prominent furrow; it is also more gibbous and has the posterior extremity more rounded. The specimens were in a piece of wood and were submitted for identification by Mrs. Virginia Aldridge of the Newark Museum, Newark, N. J. It is interesting to note that the other western Atlantic species of *Xylophaga*, *X. dorsalis* (Turton) and *X. abyssorum* Dall, are known only from deep water.—HORACE G. RICHARDS.

THE GENOTYPE OF NEPTUNEA.—In writing the opinion on the type of *Neptunea* "Bolten" Roeding, published in THE NAUTILUS, vol. 54, no. 4, April 1941, I overlooked a type designation four years earlier than that of Kobelt (1876). Monterosato in 1872 (Notizie intorno alle Conchiglie fossili Monte Pellegrino e Ficarazzi, p. 17) designated *"Fusus antiquus* monstr. *contrarius"* as the type, a perfectly valid designation, as *contraria* is the fifth species under *Neptunea* in the Boltenian Catalogue. This will fortunately involve no change in the concept of the name, as *antiqua* Linné, the type designated by Kobelt, and *contraria* Linné, are congeneric.—H. A. REHDER.

DENTALIUM (ANTALIS) PILSBRYI, new name.—The name *Dentalium* (*Antalis*) *pseudohexagonum* "Ihering" Henderson (Bull. U. S. Nat. Mus., no. 111, 1920, pp. 46–47), given to a species ranging from Brazil north to Florida, is preoccupied by *Dentalium pseudohexagonum* "Dall" Arnold (Mem. Cal. Acad. Sci., vol. 3, 1903, p. 186) from the Pleistocene of San Pedro, California. As I have been unable to find any substitute name proposed for the Antillean species, I am bestowing on it the specific name *pilsbryi*, honoring, in a small measure, the man whose epochal work on the Scaphopoda smoothed the way for all later workers.—H. A. REHDER.

NAMES PROPOSED AS NEW IN MORSE'S TERRESTRIAL PULMONIFERA OF MAINE.—Some uncertainty as to the type species of *Striatura* has arisen from the publication of that and other new names by Professor E. S. Morse in two places. In the "Observations on the Terrestrial Pulmonifera of Maine" (Jour. Portland Soc., N. H., 1: 17, March, 1864) Morse introduced and defined "Striatura, nov. gen." with *S. ferrea* nov. sp. and *S. milium* Morse. He made no allusion to any previous use of these names. In the "Synopsis of the fluviatile and terrestrial mollusca of the State of Maine," by Edward S. Morse, a four-page leaflet published *without date*, he listed *Striatura milium* Morse and *S. ferrea* Morse. In a note he stated that "all names in Italics are proposed by the author, full descriptions of which are now in preparation." From this it is inferred that Morse prepared MS.

of the Synopsis before publication of his Journal article, but when the list was actually printed remains uncertain.

Tryon in a review, 1865, gave the date 1863 for this leaflet; but since Morse stated that part of the names "have been adopted from W. G. Binney's Checklist of Dec. 9th, 1863" (Smiths. Misc. Coll. No. 000, the preface dated as above), it seems unlikely that this Checklist could have been printed and issued after Dec. 9, 1863, in time for Morse to have used it and issued his Synopsis in the same year. Someone has written "1864," on the Academy copy of the Synopsis, in an ink unlike that used by Morse on the same page. H. B. Baker (1928) has given the date of this leaflet as 1864, but without giving any authority for that date, or stating that the leaflet was undated.

We conclude that names in an undated list cannot be given priority over a dated publication in which the names in question are expressly introduced as new.—H. A. Pilsbry.

Habitat Data on *Helminthoglypta tudiculata* (Binney) at Balboa Beach, California.—The information presented here should add to the published data concerning the conditions under which *Helminthoglypta tudiculata* (Binney) s.s., lives in Southern California. Pilsbry (1939, Monogr. no. 3, Acad. Nat. Sci., Phila., p. 72) states: "It lives among bushes and plants back of Pacific Beach near San Diego. At Murray Dam, near San Diego, Mr. Ingles found it 'in the leaf mold between loose rocks, under very moist conditions.' Inland Mr. Kelsey found it aestivating in crevices of large rocks."

Twelve living individuals and five empty shells were collected from the shores bordering the salt water lakes formed by the inland extension of Balboa Bay at Balboa Beach, California. Collecting areas were on the old road leading to Santa Ana one and eight-tenths and three and three-tenths miles from the coast highway 101. Four others were taken at the base of the sandstone bluffs on the road leading from Balboa Island to Corona del Mar. The collections were made in July 25, 1941. All were aestivating.

Salt water lakes: One individual was collected beneath a luxuriant growth of the ice plant, *Mesembryanthemum*. This indi-

vidual had four epiphragms sealing the entrance to its shell. Five empty shells collected beneath patches of ice plant indicate that in this area *H. tudiculata* is definitely associated with this plant. Five individuals were found aestivating under a water carried debris pile composed of twigs and grasses six inches in thickness fifty feet from the margin of one of the salt lakes; the plants growing in the vicinity were willows and bladder-pod bushes. Six specimens were taken from beneath dried horse manure; one of these had six epiphragms sealing the aperture.

Corona del Mar road: The individuals taken here were found beneath sandstone rocks and dried grasses at the base of sandstone bluffs. Mr. F. R. Aldrich of the Aldrich Museum, Balboa, California, has collected individuals from crevices in these bluffs. —William Marcus Ingram, Mills College, California.

The Role of Vacant Shells in Snail Hibernation.—While collecting mollusks on November 22, 1940, in the Sapsucker woods, Ithaca, New York, two *Euconulus fulvus* (Müller) and one *Haplotrema concavum* (Say) were found under rather odd circumstances. These individuals were taken from within vacant shells of the large wood snail, *Mesodon thyroidus* (Say).

The *M. thyroidus* shells were collected from beneath the fallen bark of a maple tree. The bark was covered by three inches of beech and maple leaf humus. Curiosity prompted the writer to break open the *M. thyroidus* shells, thus exposing the smaller snails. One *Euconulus* and the *Haplotrema* were removed from one shell, and one *Euconulus* from the other. The former *Euconulus* was at rest in the second apical whorl and the latter in the third apical whorl of the *M. thyroidus*. The bodies of the *Euconulus* were withdrawn from their body whorls toward the apical whorls, and both were perfectly dormant. Although no epiphragm was observed at the aperture of either, these snails were no doubt in hibernation. The immature *H. concavum* was at rest in the third apical whorl of the larger species. This immature individual had a complete epiphragm at its aperture, and was quite obviously hibernating.

The two small snail species had apparently crawled into the empty shells of the larger mollusk at the onslaught of cold

weather. Five additional shells of *M. thyroidus* were collected in areas adjoining the one from which the empty shells containing the small mollusks were gathered, but none housed living snails. The occurrence of small species of snails within the discarded shells of larger species may be a rarity rather than a rule; further field collecting during the winter months will no doubt bring more data to light.

It is interesting to note, that the shell of *M. thyroidus* which was sheltering the immature *Haplotrema* from adverse weather, was probably enhancing the survival of a predator of its kind. On numerous occasions *Haplotrema* has been observed feeding on *M. thyroidus* in the woods about Ithaca.—William Marcus Ingram.

PUBLICATIONS RECEIVED

A review of the Volutidae. By Maxwell Smith. 127 pages, of which 26 are full-page plates. Small 4to, cloth, price $6. Published by the author, Lantana, Florida. In this attractive volume Mr. Smith discusses the nomenclature, classification and distribution of the volutes, followed by descriptions of the species. The 26 plates are beautiful examples of the author's skill with the camera. A feature which those using the work will appreciate is that opposite each plate the explanation of figures and references to pages are given.—H.A.P.

Illustrated Key to West North American Pelecypod Genera. By A. Myra Keen and Don L. Frizzell, Stanford University Press, Stanford University, Cal. No date. Small 4to, 28 pp. Price 75c. This key is designed to provide means for the generic identification of West coast bivalves. The text is provided with several hundred clear line figures of hinge and exterior of all genera. Though the shell characters of bivalves are probably more definite than those of univalve shells, they are less understood by shell collectors and students, especially those of the smaller forms. We do not know of any work giving so clear and easy an insight into the mysteries of the bivalve hinge. It should be useful to east coast students also.—H.A.P.

THE NAUTILUS

Vol. 56 January, 1943 No. 3

HUNTING *STENOTREMA HUBRICHTI*

By LESLIE HUBRICHT

While examining some topographic maps of southern Illinois I noted, on the Alto Pass Quadrangle, an area called Pine Hills, which was without doubt the most rugged region in southwestern Illinois. It looked as though it ought to be an ideal place for snails, so I resolved to visit it at the first opportunity. Accordingly on October 14, 1939, I paid the region my first of several visits.

FIG. 1. *Stenotrema hubrichti*, actual size and enlarged. (From Land Mollusca of North America, fig. 423.)

My first view of the Pine Hills was very disappointing, as they had been badly burned and cut over. I drove along the little road at the base of the high cliffs and examined the talus slopes at several places without finding anything of especial interest, until near the north end of the bluffs I came to a place where about twenty feet of the outer talus had been removed for road material. The cliffs are composed of a thin-bedded limestone which breaks off in small pieces which can be used for this purpose without additional crushing. In the older talus

thus exposed, shells were abundant. By far the most abundant of these shells was a flat, carinate stenotreme, which I recognized immediately was no described species. The shells were so abundant that about six hundred were collected in an hour, together with a large number of shells of other species. It was later named *Stenotrema hubrichti* by Dr. Pilsbry, whose figures are here used to illustrate it, by courtesy of the Academy of Natural Sciences. I began a search of the undisturbed talus slopes for living specimens, but without success. On subsequent trips I examined the talus slopes along the entire length of Union County without finding a single recent shell; and fossils only in the Pine Hills region. It appeared that the species was extinct.

During August, 1942, I again visited the Pine Hills, not to try to find *S. hubrichti,* but to get better series of some of the other species found there. It had rained the day before, and the weather was cloudy and threatening—an ideal day for snailing. As I climbed the talus slope at the mouth of a short, steep ravine, or "head-in" as the natives call them, I found a dead shell of *S. hubrichti*—the first shell of this species that I had found on top of the talus. As I climbed higher up the slope I found a second specimen and then a third; and then I found a woodchuck hole from which the shells had obviously come. Since other snails were common I continued to climb the slope and into the head-in. And then I found a part of a fresh shell which had been eaten by a shrew or mouse. The species was not extinct! I overturned a large number of rocks but found only two living specimens. I then turned my attention to the cliff on the south side of the head-in. This proved to be their real habitat, as they were fairly common here in crevices in the rock, and about the roots of plants on the upper part of the cliff, showing a decided preference for such situations as would require the collector to risk his neck to collect them. Their flattened shells enabled them to enter crevices that *S. fraternum* (which was found in small numbers with them), could not enter.

At one time the Mississippi River flowed along the base of the Pine Hills. Due to the influence of the river the bluffs were probably much more moist than at present, and at that time *S. hubrichti* inhabited the face of the main bluff. Later, when

the river cut through west of Fountain Bluff, thus moving about five miles away, the Pine Hills became drier and the snails moved back into the ravines where there was still sufficient moisture.

Because the species was described from fossil material the character of the epidermis could not be given. In life the shell is reddish brown and is densely covered with minute short hairs on both surfaces.

NEW MARINE SHELLS FROM FLORIDA

By JEANNE S. SCHWENGEL

Marginella denticulata destina, n. subsp. Pl. 7, fig. 1.

Shell smooth, polished, amber brown or argus brown color, opaque; fusiform, five rounded whorls, distinct sutures; spire elevated; lateral outlines of body-whorl rounded, becoming straight near the base. Aperture elliptical, more than half the length of shell; columella slightly concave, with four very strong plications, the first horizontal and the following three increasingly oblique. There is a very shallow anal retraction; the outer lip is moderately thickened, and either smooth within with the weak trace of a tooth near the upper end, or having weak traces of three or four teeth near the middle of the lip. Length 7 mm., breadth 3.5 mm., length of aperture 4 mm., width of aperture 1 mm.

Dredged in 18 to 20 fathoms of water off Destin, N.W. Florida, by T. L. McGinty. Type No. 178838 A.N.S.P.

This shell is very similar to *M. denticulata opalina* Stearns, though not quite as long and slightly wider. The color is darker and opaque rather than translucent, with no suggestion of bands as in *M. d. opalina*. The aperture is wider and longer and the outer lip not quite so thickened. In *opalina* the outlines are concave toward the base, as noted by Stearns.

Marginella idiochila, n. sp. Pl. 7, figs. 2, 3.

Shell small; smooth and glossy; biconic; light ochraceous buff with a narrow white band below the distinct suture, a wider white band below the periphery of the body-whorl and a narrow white band at the base. The apex, of about one whorl, is bluntly rounded, followed by four slightly rounded whorls. Aperture slightly less than half the length of the shell; outer

lip thick, weakly denticulate within, shortly ascending where it joins the body-whorl, and extended into a heavy, toothlike process projecting forward at about the lower third of the lip; thereafter dropping off into a thin edge to and around the well-defined anterior notch. Columella with four folds, the first horizontal and the others increasingly oblique. Height 4.5 mm., width 2.2 mm., length of aperture 2.75 mm.

Dredged by T. L. McGinty in ninety fathoms off Palm Beach, Florida. Type No. 178908 A.N.S.P.

This shell is somewhat similar to, and only slightly larger than, *M. denticulata* Conrad. The spire of *M. denticulata* is more produced and the outlines barely concave, while *M. idiochila* is slightly convex. *M. denticulata* is pure white, while our shell is buff with white bands, or in other words, white with two buff bands, and has the very distinctive knob or toothlike process on the outer lip, which makes it easy to recognize.

Eubela mcgintyi, n. sp. Pl. 7, figs. 4, 5.

Shell small, fragile, fusiform, dull buff faintly and indistinctly clouded with white, Sinusigera nucleus of about four whorls and light brown colored; followed by four adult whorls with the surface smooth and polished. The suture is appressed, and by transparence bordered with a flat band; anal fasciole faintly sculptured with growth lines, the notch rather deep, rounded and close to the suture. Axis is crossed at the base with four or five low, strongly oblique cords, beginning at upper part of pillar and ending at lower edge of lip. One specimen shows one or two very low spirals above the suture. Aperture elongated, with a rather long anterior canal, columella white, nearly straight, outer lip thin and arched forward. Heighth 5.4 mm., width 2.25 mm.

Dredged in 80 fathoms off Lake Worth, Florida, in the summer of 1940, by Thomas L. McGinty, for whom the shell is named. Type No. 178907 A.N.S.P.

This shell is very similar to the figure of *Daphnella sofia* Dall, but lacks the subsutural puckered band of that species, being in this respect more like the variety *hyperlissa* Dall. It is much smaller and more slender and the axis is not twisted and minutely pervious in basal view, as described by Dall.

Drupa didyma, n. sp. Pl. 7, fig. 7.

This small shell, of 8½ rounded whorls, with well defined sutures, has a comparatively large nucleus of 3½ whorls, the

earlier ones glossy with fine granules along the suture, the last one covered by fine rounded papillae and terminated by a narrow, elevated, curved varix, of a light brown color. The fourth whorl begins abruptly with two spiral cords, which form nodules where the axial ribs cross. The fifth, sixth and seventh whorls have three nodular spirals, and the body, or eighth whorl, has seven of these noduled spirals. Over the larger sculpture run evenly spaced spiral granular threads, two and sometimes three between each noduled spiral. The color varies from apricot-buff to cinnamon-rufous, with the nodules a carob-brown. Aperture bluish-white within, about ⅔ the length of the shell, raquet-shaped, slightly flaring outer lip with five or six lirae, the upper three or four heavy and the two lower much fainter. The shallow anal notch is accentuated by the first lira and a tubercle on the heavy callus at the upper end of the parietal wall. The sigmoid columella and parietal wall are covered by a heavy reflected callus, which becomes free and erect toward the base, leaving a shallow slit or crevice in the umbilical region, and forming the outer wall of the short, deep, recurved anterior canal. Length 10 mm., width 5 mm., length 11 mm., width 6 mm.

Dredged in 200 feet, off Palm Beach, Florida, by T. L. McGinty, June 20, 1940. Type No. 178763 A.N.S.P.

This shell is very similar to "*Ricinula*" *acuminata* Reeve, except that his illustration appears to have more lirae in the outer lip and the color in some instances is darker than the "uniform yellowish brown" of *R. acuminata*. Reeve gives no habitat for his shell, which is very sketchily described. *Drupa nodosa* C. B. Adams, from the Florida Keys and the West Indies, is similar in shape, though larger; is a greyish white with black nodules, which are larger and more pronounced, and the sutures are more appressed than in *Drupa didyma*.

The name, from the Greek, means a twin, in allusion to its resemblance to the West Coast *Drupa lugubris* (C. B. Adams), as figured by Tom Burch (NAUTILUS 54: 46, pl. 2, figs. 5, 6, 7.)

EPITONIUM (CIRSOTREMA) LINTEATUM, n. sp. Pl. 7, fig. 6.

Shell small, slender, elongated with 10 or 10½ well rounded whorls, well defined oblique sutures, with equally spaced hollows and nodules, giving a serrated appearance. Transparent, glossy white nucleus of the two remaining whorls, the first whorl or whorl and a half being lost. Each whorl is crossed by closely spaced, little-elevated axial ribs, which follow from the

nodule at the suture; the first four whorls each having one strong varix, the last three whorls without this varix, except on the body whorl, where it forms the heavy, well-rounded outer lip of the small, round-ovate aperture. The entire shell is crossed by fine punctate spirals, these punctations arranged evenly spirally and axially, so as to give the appearance of fine linen. The punctations are not so distinct over the low ribs but are quite strong over the varix which forms the outer lip. The aperture is surrounded by a thickened continuous rim close to the edge of the lip, within the varix. No umbilicus. Length of type 10.6 mm., width 2 mm., length of aperture 2.2 mm., length of aperture of broken specimen, 4.2 mm., approximate length of complete shell estimated at about 20 mm.

Dredged by T. L. McGinty in 75 fathoms off Palm Beach, Florida. Type No. 178787 A.N.S.P.

NEW MARINE MOLLUSKS FROM THE WEST COAST

By H. A. PILSBRY and AXEL OLSSON

Anomalocardia broggi, n. sp. Pl. 8, fig. 7.

Shell solid, oblong-subtrigonal, widest in the anterior portion or along a line extending from the beak to the anterior-ventral margin which is also the zone of greatest inflation. Anterior side is broadly rounded and bordered above by a nearly straight lunular margin. Posterior side is narrowly rounded and nearly twice the length of the anterior. The sculpture consists of concentric, rib-like folds present on the umbos and on the anterior submargins, generally obsolete or absent elsewhere and a series of fine, radial threads or striae, on some specimens nearly obsolete. The ground color is white or reddish brown with zigzag brown lines and generally 3, brown bands radiate from the beak. Lunule is narrowly cordate and flat. Escutcheon is narrow, excavated, its border strongly angulated in the left valve. Hinge normal, the central cardinal tooth large. Ventral margin minutely crenulated. Pallial sinus very small. Length 46 mm., height 37 mm., semidiameter 17 mm. (type).

This species has probably often been confused with *Anomalocardia subrugosa* Sby. which it may replace in the south. We have definite records of *subrugosa*, south as far as Boca Pan, near Zorritos in northern Peru. *Anomalocardia subrugosa* is a very variable species in color, size and strength of its sculpture.

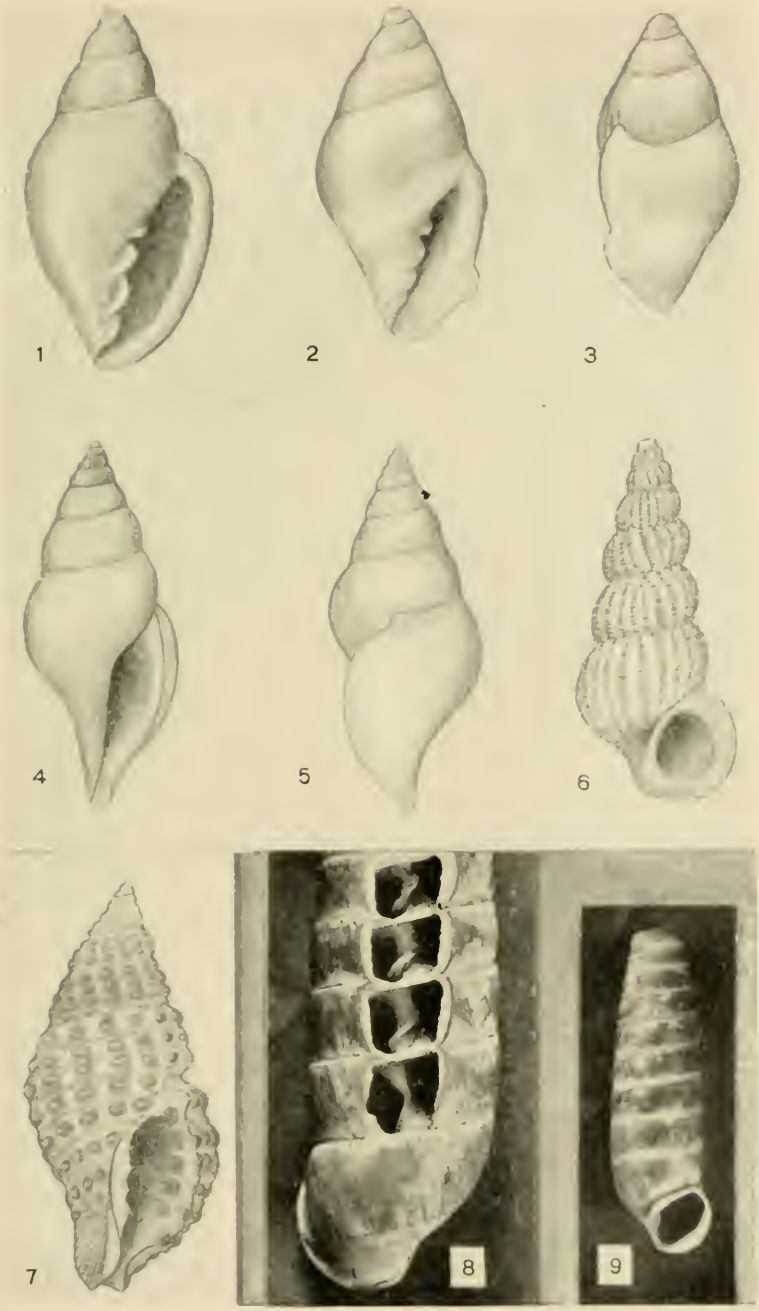
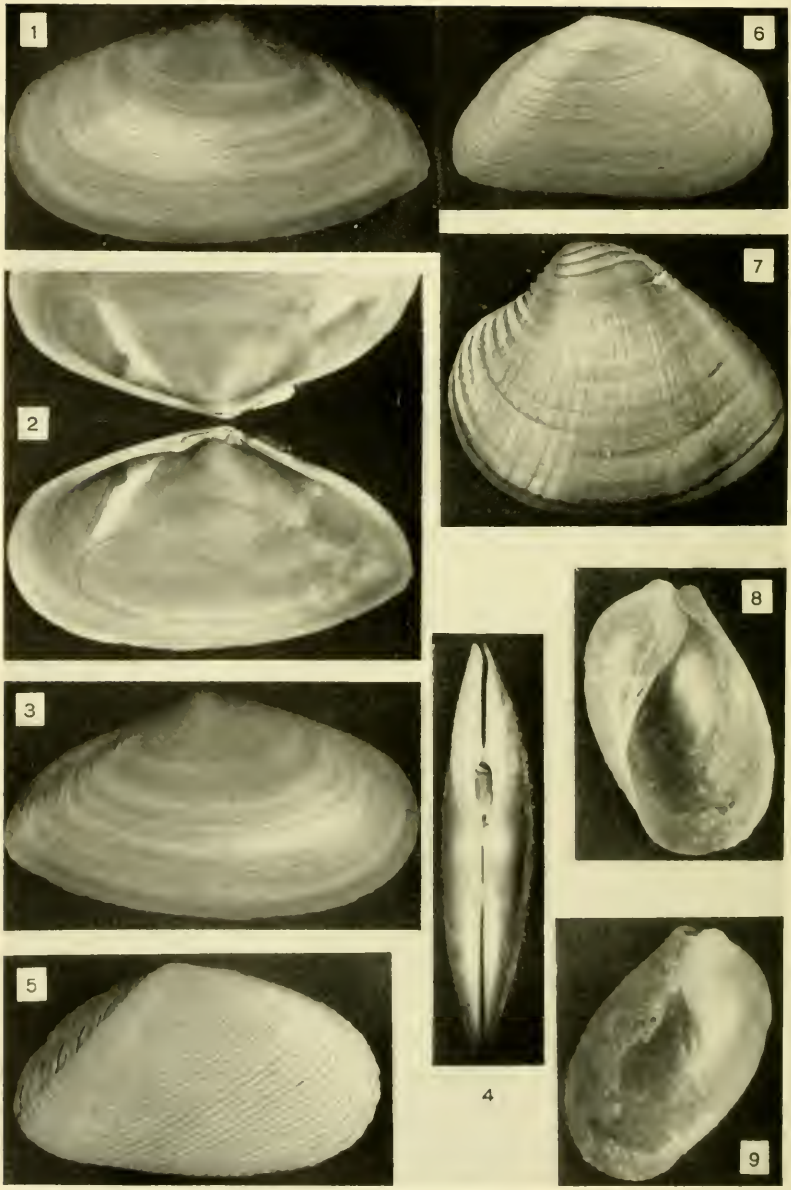


Fig. 1, *Marginella denticulata destina*. Figs. 2–3, *M. idiochila*. Figs. 4–5, *Enbola megintyi*. Fig. 6, *Epitonium lineatum*. Fig. 7, *Drupa didyma*. Figs. 8–9, *Coelocentrum bourgeisae*.



Figs. 1–4, *Tellina mantaensis*. Fig. 5, *T. virgo*. Fig. 6, *T. variincata*. Fig. 7, *Anomalocardia broggi*. Figs. 8–9, *Oxynoe panamensis*.

It is best characterized by its strong, posterior-dorsal fold extending from the beak to the posterior extremity which is generally strongly sculptured by concentric ribs. In the present species, this fold is absent or feebly developed only near the beak. *Chione subimbricata* Sby. has often been referred to *Anomalocardia* but belongs with the true Chiones. The young of *subimbricata* have the concentric ribs on the umbos with sharp, lamellar edges as in *cancellata*. As a fossil, *Anomalocardia broggi* is common in the Peruvian Tabiazos.

Type material: 178909 A.N.S.P., from Bayovar, Sechura, north Peru. Also Zarumilla, Peru.

TELLINA (SCISSULA) VARILINEATA, n. sp. Pl. 8, fig. 6.

The shell is small, thin, white, the anterior end well-rounded and about one-fifth longer than the posterior. In addition to the lines of growth which are faint, the surface is neatly sculptured with a series of fine lines which begin at the posterior-umbonal ray and cover the entire central and anterior portions of the disk. These lines are oblique to the growth-lines in the central portion but on the anterior side are nearly parallel to them. A narrow, smooth ray extends from the beak to the posterior-ventral extremity. Posterior-dorsal area slightly arched and sculptured with a series of regular, thread-like ridges. Hinge normal. Pallial sinus large, long, its lower side confluent and its end nearly reaching the anterior muscle scar. Length 17 mm., height 9.75 mm., semidiameter 2.1 mm.

Tellina virgo Hanley (Pl. 8, fig. 5), the only other previously known *Scissula* from Panama and the west coast of northern South America, differs by its larger, higher and thinner shell and as may be seen by the figure has a sculpture formed by coarser and decidedly more oblique striae. The types of *Tellina varilineata* were collected on the beach at Bucaro along the southern shores of Los Santos Province, Panama. It ranges southward to northern Peru; we have specimens collected at Puerto Pizarro, Province of Tumbez, where it occurs with *Tellina virgo* Hanley.

Type material: 178910 A.N.S.P., from Puerto Bucaro, Province of Los Santos, Panama.

TELLINA (EURYTELLINA) MANTAENSIS, n. sp. Pl. 8, figs. 1–4.

Shell rose-colored, more deeply so on the umbos, becoming somewhat brownish tinted ventrally. Its outlines as figured, has the anterior side a little longer than the posterior and the valves are a little convex, the left valve slightly more than the other, the posterior end narrower, its extremity, obliquely subtruncate. The general sculpture consists of flat, concentric ridges which are well-developed below the middle, the umbos being smooth and glossy or marked only by the fainter lines of growth. In the right valve, the posterior-dorsal area is well-marked and more strongly sculptured than elsewhere by regular, waved, raised threads, most strongly formed at its inner margin. In the left valve, the posterior-dorsal area is nearly smooth but shows faintly small, radial lines. Anterior-dorsal margin undifferentiated and plain. Interior rose-colored except around the margins and in the thickened cavity below the beaks which are white. A thickened ray borders the inner side of the anterior muscle scar. Hinge of the right valve with a strong anterior, lateral tooth adjacent to the cardinals and a more distant posterior, lateral tooth. Hinge of the left valve weaker and with smaller laterals. Pallial sinus deep, confluent below, its end nearly reaching the anterior muscle scar. Length 31 mm., height 17 mm., diameter 6.75 mm.

Type material: 178904 A.N.S.P., from Manta, Ecuador.

OXYNOE PANAMENSIS, n. sp. Pl. 8, figs. 8, 9.

The shell is oval, the diameter about 72 per cent of the length; thin, fragile and transparent, with a short, obtuse prominence in place of the spire and a deep sutural sinus; whorl decidedly contracted below the summit and showing some weak arcuate wrinkles there, the surface elsewhere being nearly smooth. Length 5.5 mm., diameter 4 mm.

This shell is not so wide as specimens of *O. olivacea* Ref. compared; it has a deeper sutural sinus and is distinctly contracted near the summit, which is not the case with *olivacea*. *O. antillarum* Mörch is a much more globose shell. Specimens of *O. viridis* Pease, from the author, also differ by their very globose contour.

The specific characters of *Oxynoe* are chiefly expressed in the coloration and proportions of the living animal (Cf. Eliot, Jour. of Conch. 11: 300), but as no species has been recorded from the West Coast up to this time, and the shell appears to differ recognizably from the Hawaiian and Antillean as well as the

Mediterranean species, all of which we have compared, it seems well to call attention to the presence of the genus in the Panamic region, though a full description awaits the finding of living animals.

Sir Charles Eliot has preferred the generic name *Lophocercus* Krohn, 1847, to *Oxynoe* Rafinesque, 1819, on account of the insufficient definition of the latter. Of course nearly all of Rafinesque's names were inadequately defined; his taxonomic writings are admitted to be unmitigated rubbish. Krohn's paper, on the other hand, was a scholarly and well illustrated production. Unfortunately, *Lophocercus* was preceded not only by *Oxynoe* but also by the poorly characterized and still-born *Icarus* Forbes, 1843; probably it is best to continue the use of *Oxynoe*, though credit for the real introduction of the genus into scientific zoölogy belongs to Krohn.

Type material: 178894 A.N.S.P., was found by one of us (Olsson) among small shells on the north shore of Bocas Island, Province of Bocas del Toro, Panama.

SOME ANTILLEAN HELICIDS

By H. BURRINGTON BAKER

These anatomical notes are founded on material from Cuba, generously sent me by Miguel L. Jaume and C. G. Aguayo, and on animals from Jamaica, Haiti and Puerto Rico, collected during the summers of 1934 and 1939. In the plates, the scales for the figures of genitalia, spermatophores and jaws represent 1 mm.; those for the lines of the right half of radular rows (T), on which widths of the lateral field and equal blocks of marginal teeth are indicated, .1 mm.; and those of radular teeth, .01 mm. (10 microns). In the descriptions, *Cepolis squamosa* is described in most detail because it appears to be closest to *Cepolis* s.s. All spermatophores observed are mentioned. Differences which have already been included in the key and discussions are usually not repeated under the separate species.

In the following synopsis of the groups of Antillean helicids, each group is followed by its type species, with the type island,

and asterisks are used to mark groups or type species of which the anatomy is still unknown:

CEPOLIS Montfort (1810), subgenus *Hemitrochus* Swainson (1840): sections *Euclastaria* Pilsbry (1926), *C. musicola* (Sh.), Puerto Rico; *Taenioraphe* * Pils. (1933), *C. leucoraphe* (Pfr.), Hispaniola; *Cysticopsis* Mörch (1852), *C. cubensis* (Pfr.), Cuba; *Hemitrochus* s.s., *C. varians* (Menke), Bahamas, + *Polytaenia* Martens (1860), *C. multifasciata* * (W. & M.), Bahamas.

Subgenus *Cepolis* s.s.: sections *Plagioptycha* Pfeiffer (1856), *C. loxodon* * (Pfr.), Hispaniola; *Cepolis* * s.s., + *Cepolum* Montfort (1810), *C. cepa nicolinsianum* Montfort, Hispaniola; *Bellacepolis* Pilsbry, new, type *C. squamosa* (Fér.), Puerto Rico; *Levicepolis*, new, type *C. boriqueni* H. B. B., Puerto Rico; *Jeanneretia* Pfr. (1877), *C. multistriata* * (Desh.), Cuba; *Eurycampta* Martens (1860), *C. bonplandi* (Lam.), Hispaniola; *Coryda* Albers (1850), *C. alauda* (Fér.), Cuba, + *Histrio* Pfr. (1855), *C. dennisoni* (Pfr.), Cuba.

POLYMITA Beck (1837), *P. picta* (Born), Cuba.

SETIPELLIS Pilsbry (1926), *S. stigmatica* (Pfr.), Cuba.

DIALEUCA Albers (1850): sections *Leptoloma* Martens (1860), *D. conspersula fuscocincta* (C. B. Ad.), Jamaica; *Dialeuca* s.s., *D. nemoraloides* (C. B. Ad.), Jamaica.

Because of the considerable radular and other differences, some of the sections of *Cepolis* should probably be elevated to subgenera (but give no excuse for a recent careless tendency to treat them as genera), although more species must be examined and some of those dissected years ago need additional study before this can be satisfactorily done. The following key outlines the genera and subgenera of Antillean helicids and indicates their relationships with the other North American groups.

A. Dart-bearing (if not, see J); large epiphallus with flagellum (see H); spermatheca long and often with diverticulum (see E); dart-glands not saeculate apically or single (see D), but 2, which enter basally enlarged vagina (see C) near base of single dart-sac (see B); mainly tropical Central America: genera *Averellia, Leptarionta, Xanthonyx.*[1]

B. Like A but with more than 2 dart-glands, which enter vaginal wall above more than one dart-sac; mainly temperate Central America: ....genera *Bunnya, Humboldtiana,*[2] *Lysinoe.*

[1] Xanthonycidae Strebel & Pfeffer is the earliest (1879) family name for an American genus.

[2] Humboldtianinae Pilsbry (1939).

C. Like A but dart-glands entering dart-sac near apex (Cf. E); shell internal and pericardium inside kidney; Mexico: genus *Metostracon*.

D. Like A but dart-sac on atrial vestibule or/and dart-gland becoming single or/and apically sacculate (finally forming dart-sheath and developing 2 proximal glands on its ducts); western North America: genera *Monadenia*, *Micrarionta*, *Helminthoglypta*.[3]

E. Like D but ductless dart-sheath with large sheath-glands; proximal gland single, emptying near apex of dart-sac (Cf. C); unbranched spermatheca not reaching aorta (see A); Antillean genera.[4] Spermathecal sac above middle of uterus; penis and verge small, almost opposite atrial sac; shell not hirsute; jaw smoothish (see H); radular central and laterals unicuspid or nearly so (see G); genital talon short or swollen only at imbedded base; sheath gland with 2 basally contiguous or confluent groups of many parallel tubules, which empty into shallow convexity of dart-sheath (see F); Caymans, Jamaica and Florida to Virgin Islands: genus *Cepolis*, subgenus *Hemitrochus*.

F. Like E but talon clavate or digitiform and emerging from albumen gland; sheath-gland usually bilobed and consisting of numerous, usually shorter tubules, which radiate pinnately from large, simple or bifid duct; Cuba to Virgin Islands: .....subgenus *Cepolis* s.s.

G. Like E or F but radular central and laterals tricuspid and elongate like marginals; Cuba: .....genus *Polymita*.

H. Like E but short epiphallus with almost no flagellum (see A); spermatheeal sac below middle of uterus; penis and verge larger, below atrial sac; shell hirsute; with sunken spire; jaw ribbed; one sheath-gland with few long tubules and another vestigial or absent; Cuba: ...genus *Setipellis*.

I. Like H but epiphallus absent, so penis, which is above atrial sac and apparently secretes membranous spermatophore, is entered by vas through retractor and between low folds; shell, jaw and talon more like F; 2 sheath-glands subequal and distant; Jamaica: .....genus *Dialeuca*.

J. Like A but without dart-apparatus or vaginal enlargement; flagellum vestigial or absent; spermatheca unbranched; southwestern North America: genera *Sonorella*,[5] *Tryonigens*.

---

[3] Helminthoglyptinae Pilsbry (1939).

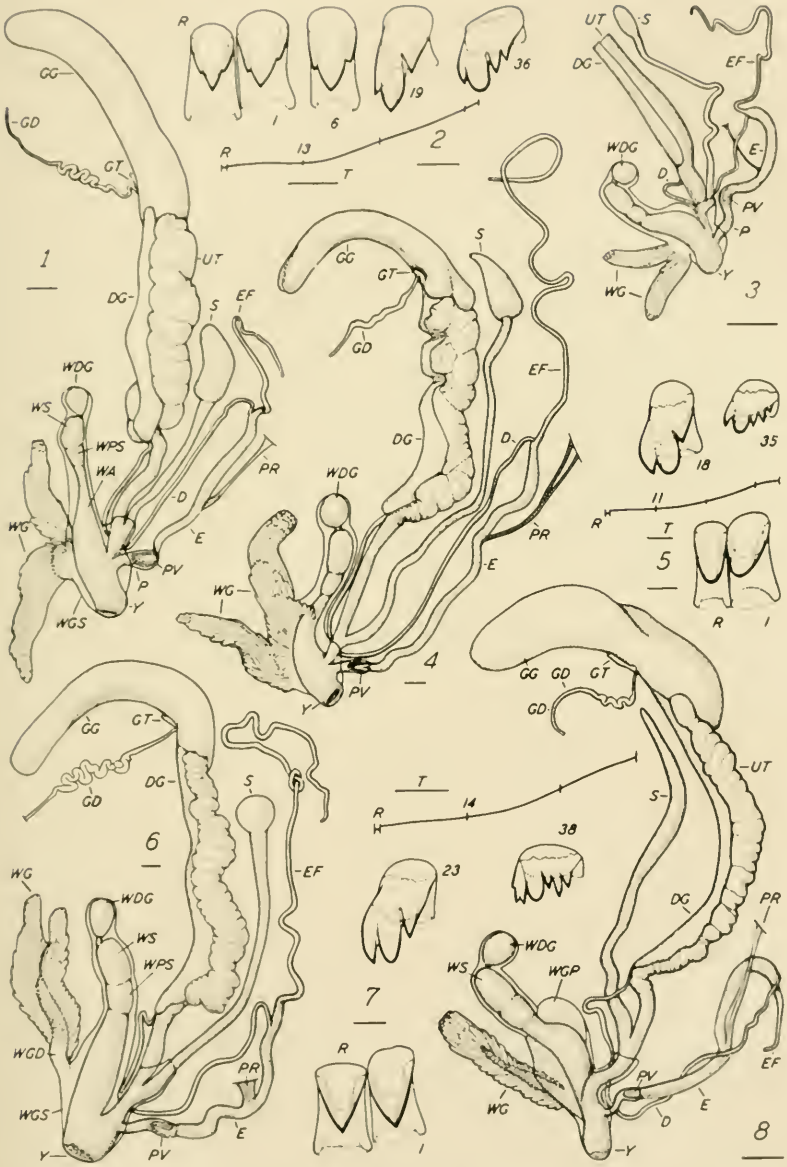
[4] Cepolinae H. B. B. (April, 1939). Cepoliinae Pilsbry (Dec., 1939).

[5] Sonorellinae Pilsbry (1939).

Another noteworthy feature of the Antillean helicids is their extremely long kidney (K, f. 13). In many species, the genital talon (GT, f. 10) is about as large and evident as in *Averellia*. The unbranched spermatheca (S) is columellar in position and thus perhaps corresponds to the diverticulum of *Averellia*. The dart-sac (WS), with its basal sphincteric sac of the dart-papilla (WPS, f. 11), is always seated on an "atrial" sac (WA, f. 10), but this vestibule opens above the penis (i.e., into the vagina) in *Setipellis* (f. 14), as in some species of *Helminthoglypta* and *Monadenia* and like the dart-sacs of *Micrarionta* and groups A to C of the key.

In all the Antillean genera, the peculiar sheath-glands (WG, f. 10) are bipartite to some degree and, in most species, this dual division is continued into the cavity of the dart-sheath (WGS; outlined only) by an incomplete partition (at WGP) that runs between the glands to the atrial sac (WA) and from the last to the dart-sheath beyond (see f. 8). Partly because of their double nature, the dart-sheath, which is also present in *Helminthoglypta,* and its compound tubular sheath-glands seem to me to be homologous with the terminal sacs of the dart-glands of *Micrarionta* and perhaps with the dart-glands of the genera in groups A to C. The resemblance between these structures in Pilsbry's fig. 115 (Land Moll. N. A. I) and in Hanna's drawing (copied as Pilsbry's f. 91) appears more than fortuitous. Similarly, the proximal dart-gland (WDG), of which *Helminthoglypta* has 2, probably corresponds to the swellings on the ducts of some species of *Eremarionta* (Pilsbry, f. 115–2b). The ducts between the dart-sheath and the proximal glands are retained in *Helminthoglypta* but apparently have become obsolete in the Antillean groups. Incidentally, von Ihering's "ductus receptaculo-uterinus" is actually a blood-vessel, which has numerous branches to the prostate, uterus and dart-apparatus and may reach the last as low down as the middle of the dart-sac.

The ribbed jaw of *Setipellis* (f. 17) removes another difference between the Antillean and most mainland genera. The radulae of the terrestrial species of *Cepolis* (e.g., f. 2) are rather similar to those of many mainland genera, but the arboreal species tend to develop broadly rounded or truncate mesocones (see f. 20).



Figs. 1–2, *Copolis musicola*. Fig. 3, *C. debilis*. Figs. 4–5, *C. graminicola*. Fig. 6, *C. boriquenae*. Figs. 7–8, *C. indistincta*.

Figs. 9–13, *Cepolis squamosa*. Figs. 14–17, *Setapellis stigmatica*. Fig. 18, *Diaulula conspersula*.

Cepolis (Euclastaria) musicola (Shuttleworth). Pl. 9, figs. 1–2. Man. Conch. 3: 97.

The dissected animals were collected Aug. 20–21, mainly on the ground, in the canyon of Rio Grande de Arecibo (PN 1), Puerto Rico (A.N.S.P. 178775).

Like *C. graminicola* but: Apex dark above. Lung with complicated pattern of white spots on black or vice versa; 1.2 length of kidney, which is almost 5 times pericardium. Ovotestis (omitted from f. 1) with 4 fans of alveoli. Talon (GT) a slender thread, expanded into 2 discs at apex. Spermatheca (S) reaching .7 up short uterus (UT). Sheath-glands (WG) 2, confluent only where tubules, mostly long, discharge. Dart gradually expanding towards base. Dart-papilla somewhat swollen basally. Verge (uncovered at PV) with opening (hidden) near base and with apex spatulate. Atrium (Y) opens as far behind right tentacles as distance between them. Radular formula (f. 2) $42 + R + 13 + 29 = 85$ in 164 rows; central and inner laterals with acute mesocone and lateral notches; inner marginals elongate tricuspid, with mesocone obtusely pointed and entocone smaller; outer teeth often dividing ectocone.

C. (E.) debilis (Pfeiffer). Pl. 9, fig. 3. Man. Conch. 3: 101. Naut. 52: 144.

The dissected animals were collected by C. G. Aguayo, April, 1931, near Matanzas, Cuba. The figured genitalia are not quite mature; in an adult, the sheath-glands are longer.

Like *C. musicola* but: Head without median stripe. Ovotestis (organs above middle of uterus omitted from f. 3) with 5 fans. Talon short, mainly buried in adult; emergent and apically bifid in young. Spermatheca (S) reaching .8 up uterus. Epiphallic body of spermatophore 3-sided, with angles produced into simple ridges. Verge (uncovered at PV) teat-shaped. Radular formula $33 + R + 9 + 24 = 67$ in 133 rows.

C. (Hemitrochius) graminicola (C. B. Adams). Pl. 9, figs. 4–5. Man. Conch. 5: 36. Cf. *C. varians* (Menke), Pils., Land. Moll. N. A. I: 26, f. 13, anatomy.

The dissected animals were collected in late June on leaves of trees, near Mandeville (MM3b), Jamaica (A.N.S.P. 165783). The genitalia resemble those of *C. varians* in the vestigial talon, the spermatheca, the high insertion of the penial retractor and

in the ductless sheath-gland, but, in *C. graminicola,* the last seems still more diffuse, the vagina and verge are shorter and the flagellum is longer. In figure 4, the convex sides of the sheath-glands are shown, as in Pilsbry's of *C. varians;* in all my figures of other species, the opposite flat sides are shown.

Like *C. squamosa* but: Head with black dorsomedian stripe and lateral bands; sole edged with black. Lung with veins outlined in brown; 1.5 times kidney. Ovotestis (omitted from f. 4) with 3 lobes. Talon (dug out at GT) not emergent, consisting of a stubby fan of clavate caeca. [In 2 animals, only base of dart, like that of *C. varians,* remained.] Dart-papilla and its sac (WBS) longer and not swollen basally. Verge (uncovered at PV) conic with rounded tip; epiphallic opening near base, but continued almost to apex by groove. Atrium (Y) opens twice as far behind right tentacles as they are apart. Radular formula (f. 5) $37 + R + 11 + 26 = 75$ in 137 rows; all teeth more elongate.

C. (Plagioptycha) indistincta (Férussac). Pl. 9, figs. 7–8. Man. Conch. 5: 14. Cf. *C. duclosiana salvatoris* (Pfr.), Man. Conch. 9: 185, anatomy.

The dissected animals were obtained late in June, 1934, under rocks, about up to Kenskoff from Port-au-Prince, Haiti. Apparently, *C. duclosiana* has a much more deeply bifid sheath-gland than does *C. indistincta,* which seems quite closely related to the type species of *Plagioptycha.*

Like *C. squamosa* but: Foot with dark lateral band and head with dark middorsal stripe and ommatophores. Lung with brown or black spots; 1.4 length of kidney. Ovotestis (omitted from f. 8) with 2 lobes. Sheath-gland (WG) undivided; partitions (WGP) of sheath-cavity heavy and broad. Verge (uncovered at PV) little more than a ring with teat-shaped papilla on one side. Atrial opening as far from right tentacles as distance between them. Jaws thickened mesally. Radular formula (f. 7) $40 + R + 14 + 26 = 81$ in 64 rows; central and laterals acute; inner marginals more elongate, with entocone and mesocone subequal.

Cepolis (Bellacepolis) squamosa (Férussac), **new subgenus.** Pl. 10, figs. 9–13. Man. Conch. 5: 95.

One adult animal was collected, Sept. 2, after a search of almost a month, in dead *Cecropia* leaves caught in the crotch of

a small tree, about 5 ft. up, near Old Loiza (EN 1), Puerto Rico (A.N.S.P. 178776). The section *Bellacepolis* Pilsbry lacks the well marked basal tooth of *Cepolis* s.s. and is more strongly decussate and granulate. It does have the tooth-like indentation above and along the carina behind the aperture; this is lacking in *Jeanneretia*. It is probably the nearest relative of *Cepolis* s.s. yet dissected.

Like *Averellia cordovana* (Pfr.), H. B. B. (1927, Proc. A.N.S.P. 79: 242) but: Foot fairly large and stout; dark on sides and tentacles; tail rounded above without median groove; sole narrowly rounded at tip. Mantle-collar (f. 13) with glands rarely invading lung; basal shell-lobe (LU) rounded; mantle-lappets fairly short; palatal ones (MA, MP) widely separate. Lung with heavy black network; minor venation strong (not shown); about 7 times as long as its base or twice very narrow kidney (K), which is 7 times its base or 5 times pericardial length (H). Ovotestis (omitted from f. 10), with 4 lobes, each with few fans of clavate alveoli. Talon (GT) clavate, with white conical tip and not imbedded in albumen gland. Carrefour with clavate apex (dug out at X) and with bulb under prostate (DG). Spermatheca unbranched, with sac (S) just below aorta; long stalk (SS) columellar in position [spiral twist due to enclosed spermatophore]. Sheath-gland (WG) roughly semi-circular in cross-section; flat side (uppermost in all my figs. except *C. musicola*) with duct (WGD), from which numerous, short to moderately long, mucous tubules radiate, so that only ends are visible on convex side; bifid more than half its length. Dart-sheath (WGS) thin, attached at apex of proximal dart-gland but with no duct visible; partition (WGP) much heavier than outside wall. Proximal dart-gland (WDG) globose, with short duct entering dart-sac subapically. Dart-sac (WS) ellipsoid, thick walled, opening through dart-papilla (WP, f. 11). Dart similar to *C. varians*, but with base gradually enlarged; evidently shed, since one was found free in atrial sac. Sac of dart-papilla (WPS) appearing externally as heavy muscled sphincter and internally (f. 11 opened lengthwise) weakly plicate; extending shortly into apex of large vestibular sac (WA), which is internally smooth. Epiphallus (E) with long flagellum (EF) and opening (EP) near base of flattened verge (uncovered at PV); retractor (PR) arising near base of uterus and inserting on epiphallus. Spermatophore (pieces found in spermatheca) with epiphallic body (f. 9–A, transverse section) roughly 4-sided with 3 angles irregularly bipartite and 4th with some recurved hooks; tail (f. 9–B) circular in section but consisting of spirally involute plate. Penis proper (P) small;

internally with weak axial folds near base. Atrium (Y) opening quite high and about 2 mm. behind ommatophore. Jaw ribless. Buccal bulb about as broad as long. Salivary glands thin and diffuse, more or less confluent above. Oesophagus above nerve-ring as stout as and continuous with stomach, which thus appears very long and half included in body-cavity. Radular formula (f. 12) $42 + R + 15 + 27 = 85$ in 165 rows (T); central and inner laterals unicuspid with narrowly rounded mesocone; outer 1 or 2 laterals with small ectocone; inner marginals tricuspid with rounded mesocone and stout entocone; outermost 11 becoming shorter and broader with ectocones and entocones subdivided.

Cepolis (Levicepolis) boriquenae H. B. B., **new subgenus.** Pl. 9, f. 6. Naut. 53: 107.

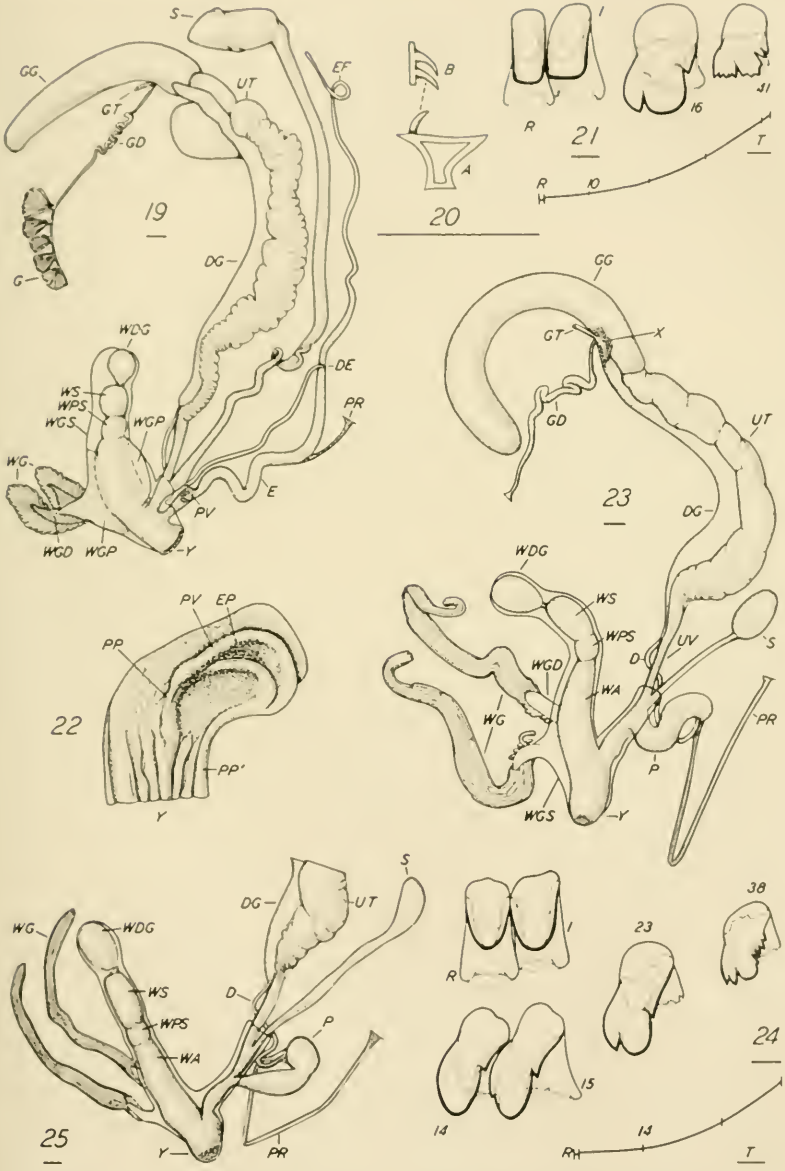
The dissected animals were collected, mainly in dead *Cecropia* leaves caught in vines, and shrubs, in the canyon of Rio Grande de Arecibo (PN 1), Puerto Rico A.N.S.P. 178777). The section *Levicepolis* is more arboreal than typical *Plagioptycha* and has a radula, spermatheca and flagellum much more like those of *C. dermatina*. Its shell is imperforate instead of rimate.

Like *C. squamosa* but: Foot less pigmented. Lung lightly shaded, with black spots along suture; 1.4 times kidney length. Ovotestis (omitted from f. 6) with 3 lobes. Spermathecal sac (S) .6 way up uterus. Duct (WGD) of sheath-gland (WG) undivided. Verge (uncovered at PV) subconic, with basal opening and a sulcus on opposite side (up in fig.). Penis (P) surrounded by a free sheath. Radular formula $50 + R + 9 + 41 = 101$ in 136 rows; teeth similar to those of *C. dermatina* but laterals often with less abruptly truncate mesocone.

C. (Jeanneretia?) dermatina (Shuttleworth). Pl. 11, figs. 19–21. Man. Conch. 5: 50. Cf. *Helix parallela* Poey, Memorias II: 88, pl. 6, f. 6, genitalia.

The dissected animals were collected Sept. 8 in dead *Cecropia* leaves caught in vines and trees, near Adjuntas (PR–4), Puerto Rico (A.N.S.P. 178774). *C. dermatina* seems fairly closely related to *C. boriquenae* and may be nearer *Levicepolis* than to the Cuban *Jeanneretia*.

Like *C. squamosa* but: Head dark above; lung brownish along veins and over kidney. Ovotestis (G, f. 19) with 5 lobes. Talon (GT) almost digitiform. Uterus (UT) with apical gelatinous swelling. Spermathecal sac (S) shorter; spermatophore (partly



Figs. 19–21. *Cepolis dermatina*. Figs. 22–24, *Dialaea nemoraloides*. Fig. 25, *D. subconica*.

in stalk and not completely empty) with epiphallic body 3-sided (f. 20–A, cross-section), bearing, along one angle, a row of hooks, which curve towards side and away from tail (f. 20–B, lateral view). Dart-sheath of figured animal filled with masses of mucus. Verge (uncovered at PV) a short dome, excised near base by epiphallic orifice. Radular formula (f. 21) 43 + R + 10 + 32 = 87 in 129 rows; central and laterals with truncate mesocone; inner marginals more squarish, but outer more elongate.

Setipellis stigmatica (Pfeiffer). Pl. 10, figs. 14–17. Man Conch. 3: 100. Naut. 52: 143.

The two animals dissected were obtained by Miguel L. Jaume at Puerta de Aneón, Viñales, Pinar del Rio, Cuba (A.N.S.P. 163914). Although its large penis, reduced epiphallus, ribbed jaw and *Suavitas*-like shell demarcate *Setipellis* as a genus, its short spermatheca and two sheath-glands are approached by *Euclastaria*, which Pilsbry on conchologic grounds also considered congeneric.

Like *C. squamosa* but: Head dark with white spot on either side and shading into pale tail. Lung (and apical whorls) dark; 1.4 length of kidney, which is 4 times pericardium. Talon (GT, f. 14) extremely slender basally. One sheath-gland (WG) with almost no duct and about 9 long tubules; other vestigial (fig.) or absent; both attached below dart-apparatus. Dart in dart-sac (WS). Epiphallus (E) very short, with blunt flagellar caecum (EF); opening through slit in side of conic verge (PV, f. 16). Penis proper (P; opened lengthwise in f. 16) with sheath (PS) which receives branches from retractor (PR); internally with stronger axial folds. Atrium (Y) opening below ommatophore and behind inferior tentacle. Jaw (f. 17) with 5 ribs, of which median is strong and outermost very weak. Radular formula (f. 15) 40 + R + 16 + 24 = 81 in 134 rows; central with narrowly rounded mesocone; inner laterals with acute ones; marginals, mainly tricuspid, with mesocone and entocone subequal.

Dialeuca (Leptoloma) conspersula (Pfeiffer). Pl. 10, fig. 18. Man. Conch. 5: 38. Cf. *C. c. platystyla* (Pfr.), Man. Conch. 9: 183, jaw and radula.

The figured genitalia are from the typical subspecies, collected Aug. 1, near Bullett Hall (NMV), Jamaica (A.N.S.P. 165749), but a radula is from var. *fuscocincta* (C. B. A), ob-

tained July 28, at Comfort Hill (NM2a, A.N.S.P. 165768). In an animal of the typical form, the right eye muscle was caught over only the penial retractor but, in those of the variety, it was still in the peniovidueal angle.

Like *D. nemoraloides* but: Foot almost black; sole dark on later thirds. Mantle-collar dark. Lung veins darkly outlined. Ovotestis (omitted with ⅔ spermoviduct from f. 18) with 5 lobes. Sheath-glands (WG) stouter; sheath (WGS) and especially partition much thinner. Spermatheca (S) reaching .4 up uterus. Dart broken off near base [slightly curved and flattened towards tip in var.]. Dart-papilla longer than its sac (WPS). Penis (P) internally with outer vergic fold much higher, inner one shorter and both principal pilasters high to near base. Radular formula 44 + R + 18 + 26 in over 137 rows.

Dialeuca (s.s.) nemoraloides (C. B. Adams). Pl. 11, figs. 22–24. Man. Conch. 5: 40.

The dissected animals (A.N.S.P. 165785) were collected with *C. graminicola*. Although conchologically similar to *Coryda, Dialeuca* is anatomically the most divergent genus in the Antillean helicids, and is apparently more related to *Sctipellis*. It completely lacks an epiphallus, unless the space between the vergic folds be considered a vestige.

Like *C. squamosa* but: Foot pale brownish; tentacles dark. Lung whitish, with some brown anteriad; 1.3 length of kidney, which is almost 4 times pericardium. Ovotestis (omitted from f. 23) with 7 fans of alveoli. Sheath-glands (WG) 2, almost on opposite sides of dart-sheath (WGS) and with partition (not shown) ending between them; tubules fewer and mostly much longer. Vas deferens (D) short, entering (EP, f. 22) near apex of penis between vergic folds (PV). Penial retractor (PR) looping forward under right ommatophoral retractor and nerves, then back to insert around vas entrance. Penis (P) internally (opened lengthwise in f. 22) with stronger pilasters basally; apical half pebbled, with 2 principal pilasters (PP) bifurcating to form high vergic loops (PV). Atrium (Y) opens 2 mm. behind and little below ommatophore. Radular formula (f. 24) 41 + R + 14 + 27 = 83 in 137 rows; outer marginals more elongate.

Dialeuca (s.s.) subconica (C. B. Adams). Pl. 11, fig. 25. Man. Conch. 5: 40.

The figured animal was collected Aug. 29–31, in the John Crow Mts. (EEJ), Jamaica (A.N.S.P. 165750).

Like *D. nemoraloides* but: Foot darker. Lung lightly pigmented with row of black bars along suture; 1.4 length of kidney. Ovotestis (omitted with most of spermoviduct from f. 25) with 4 lobes. Talon straight or recurved. Spermatheca (S) reaching almost halfway up uterus. Sheath-glands (WG) closer; sheath (WGS) and partitions thinner. Penis (P) with thinner vergic folds scarcely continued into principal pilasters. Jaw with 5 weak undulations. Radular formula 49 + R + 16 + 33 = 99 in 156 rows.

A NEW SUBGENUS AND SPECIES OF COELOCENTRUM

By PAUL BARTSCH

Ptychocentrum, new subgenus.—In a sending of shells recently received from Miss Marie E. Bourgeois, is a specimen collected by Pablo Roveglia at Teepatan, Chiapas, Mexico, the columellar axis of which is decidedly different from that of any other shell known. I therefore consider it entitled to a distinct group designation, which is here bestowed. The axis of this shell is moderately broad and hollow, expanding about one-fourth of the distance posterior to the base into a broad basally curved lamella. The axis and the posterior portion of the lamella are crossed by strong, retractively curved axial ribs. The portion of the axis anterior to the hoodlike expansion of the lamella is smooth. In the last portion of the last whorl the axis consists of a mere spiral twist, of which the reduced lamella forms the outer edge. The axially ribbed hollow axis suggests *Coelocentrum;* the strong spiral lamella, *Eucalodium.* Type: *Coelocentrum* (*Ptychocentrum*) *bourgeoisae,* new species.

Coelocentrum (Ptychocentrum) bourgeoisae, new species. Pl. 7, figs. 8, 9.

Shell large, cylindro-conic, pale chestnut brown with white suture. The whorls remaining are very slightly rounded, nar-

rowly shouldered at the summit and crossed by irregular, retractively slanting, somewhat vermiculated, sub-obsolete axial riblets, which are best pronounced near the summit and the suture. Suture moderately constricted. Periphery of the last whorl slightly angulated. Base short, well rounded with an umbilical pit marked by the continuation of the feeble axial riblets. The last whorl is solute for about one-twentieth of a turn. Aperture irregularly oval; peristome thickened and reflected. The interior of the aperture shows the columellar fold on the inner lip which it renders sigmoid. The type, U.S.N.M. No. 536900, has 9.1 whorls remaining, which measure: Height, 54.6 mm.; greater diameter, 18.3 mm.; lesser diameter, 16.2 mm. Columella as defined in the subgeneric diagnosis.

SPOROCYSTS OF LEUCOCHLORIDIUM IN SUCCINEA FROM NEW YORK STATE

By William Marcus Ingram
Mills College, California
Zoological Laboratory, Cornell University
and
Oliver Harold Hewitt
Zoological Laboratory, Cornell University

Two different sporocysts of *Leucochloridium* are reported for the first time from New York State. The previously reported North American records of sporocysts of *Leucochloridium* are Iowa (Magath 1920), Michigan (Ward 1918), Ohio (Woodhead 1935), Illinois (Miller 1936), Indiana (Call 1898), Louisiana (Gower 1936), and Tennessee (Byrd 1940). McIntosh (1932) has described several species of adult *Leucochloridium* from Michigan and Alaska.

Both of the sporocyst types discussed here were taken from *Succinea ovalis* Say. One, collected at Ithaca, New York on May 23, 1940 by W. E. Heming, was banded with green, white, and dark brown; another collected on the Edmund Niles Huyck Preserve, Rensselaerville, Albany County, New York, on June 28, 1940 by the senior author, was banded with brown and white. These two collections of *Succinea* have been the only ones found in the two New York localities. At Rensselaerville, 300 speci-

mens of *S. ovalis* were gathered from the area in which the infected snail was found, but all were without parasites.

The Ithaca Sporocyst

The green, white and dark brown mature sporocyst branch was situated in the right tentacle of *Succinea*. When brought into the laboratory, the pulsating action of this sporocyst was vigorous, often causing it to contract completely out of the tentacle into the haemocoel, out of sight of the observer. After such violent contraction took place the branch always regained its position in the right tentacle, never erring and entering the cavity of the left tentacle, or being trapped in the haemocoel. The pulsations only took place when the branch was kept away from direct light. When the rays from a 60 watt bulb were thrown on the snail the branch became less active in its pulsations, and eventually contracted out of the tentacle. When the direct light was removed the pulsating movements were resumed. When the branch was completely retracted, it was noted that the right tentacle had been permanently stretched until it was about twice the size of the left one.

The mature sporocyst branch was removed and placed in normal saline solution. In the solution it began to discharge metacercaria from two holes caused by injury in removing it from the body of the snail. The metacercaria were popped out with such force that they were sent from 10 to 15 mm. away from the sporocyst branch.

Measurements of the sporocyst branch were taken after it had been preserved in three percent formaldehyde; it was 14 mm. in length and 2 mm. broad. The color of the mature sporocyst branch was most varied. The extreme distal end was light brown with three wart-like protuberances colored deep reddish-brown arranged around the center of the distal end. This zone was .25 mm. wide. The next color band, 2 mm. wide, was yellow-green flecked with white and red-brown spots which overlapped one another. Next was a zone of unspotted green about 1.25 mm. wide. This zone was followed by a band 1 mm. in width which had a white background with irregular green spots in an unorderly circlet. The most proximal band was 2 mm. in width

with irregular longitudinally arranged streaks of red and white alternating with one another. The remaining portion of the sporocyst branch and its stalk were white in color.

The Rensselaerville Sporocyst

In the single specimen of *Succinea ovalis* collected at Rensselaerville, Albany County, New York, three well developed sporocyst branches were found. One was situated in each tentacle, and a third between them in the haemocoel. These branches were removed from the snail, the colors were noted, then they were preserved in three percent formaldehyde and measured. The left branch was 19 mm. by 4 mm., the right branch 17 mm. by 3 mm., and the middle branch 15 mm. by 3 mm. All three were banded very similarly with brown and white. The right and center branches each had sixteen bands of color, while the left branch had eleven. In the table below, which lists the color bands in order beginning at the distal ends, one can see that the three branches were similar in appearance.

Color Bands of the Rensselaerville Sporocyst Branches

Right Branch	*Center Branch*	*Left Branch*
red-brown	red-brown	red-brown
white	white	white
brown	brown	brown
white	white	dark brown, narrow
brown	brown	white
dark brown, narrow	white	light brown
light brown	brown	white
white	dark brown, narrow	brown
light brown	light brown	white
white	white	brown
light brown	light brown	dark brown, broken
white	white	
dark brown	light brown	
white	white	
dark brown	light brown	
dark brown, broken	dark brown, broken	

Below the dark brown, broken line, the proximal portion of the mature branches had numerous incomplete transverse brown lines.

The left and center branches were opened, and the metacercariae contained in them were counted. In the left branch were 160 metacercariae, and in the middle branch were 100 metacercariae.

Acknowledgments

The writers wish to thank Mr. Frank Collins Baker of the University of Illinois for identification confirmation of *Succinea ovalis* (Say). Gratitude is expressed to Mr. Ralph Smith, Assistant in Invertebrate Zoology at Cornell University for his cooperation, and to Dr. W. E. Heming of Whittier College, California, for the Ithaca collection.

Bibliography

Byrd, E. E.
1940. Larval flukes from Tennessee I. A new mother sporocyst of a *Leucochloridium*. Rep. Reelfoot Lake Biol. Sta. 4: 117–123.

Call, R. E.
1898. A descriptive illustrated catalogue of the mollusca of Indiana. Rep. State Biologist, Indianapolis, p. 403.

Gower, C.
1936. New sporocysts of *Leucochloridium* from Louisiana. Journ. Parasitol. 22: 375–378.

McIntosh, A.
1932. Some new species of trematode worms of the genus *Leucochloridium* Carus, parasitic in birds from Northern Michigan, with a key and notes on other species of the genus. Journ. Parasitol. 19: 32–53.

Magath, T. B.
1920. *Leucochloridium problematicum* n. sp. Journ. Parasitol. 6: 105–114.

Miller, E. L.
1936. Studies on North American Cercariae. Illinois Biol. Monogr. 14: 96–99.

Ward, H. B.
1916. Notes on two free-living larval trematodes from North America. Journ. Parasitol. 3: 10–20.

Woodhead, A. E.
1935. The mother sporocysts of *Leucochloridium*. Journ. Parasitol. 21: 337–346.

HABITAT OBSERVATIONS OF *ARIOLIMAX COLUMBIANUS* GOULD

By WILLIAM MARCUS INGRAM and HELEN M. ADOLPH
Mills College, California

Evidence is presented here which indicates that the California native slug, *Ariolimax columbianus* Gould, tends to have a possible homing instinct. Data indicate, too, that a possible temporary commensalism exists during extended dry periods between the sow bug, *Porcellio scaber* Latreille and this slug. Observations were carried out behind the Mills College Campus, Oakland, California.

One specimen of *Ariolimax columbianus* Gould was found in fallen humus of *Salix* in the bottom of a dry stream bed, which was shaded throughout the day by overhanging willows. The slug had excavated a concave depression approximately one by four inches in the loose soil washed into the stream bed from the banks; the concavity was lined on the bottom by secreted mucous. Slime tracks to and from the collecting spot indicated a probable homing instinct. Fecal masses in all stages of dessication from fresh to dry were observed in the same area. Both fecal masses and dried slime tracks were detected on a semi-prostrate willow up to a height of three feet above the ground, giving evidence of arboreal tendencies.

A second *Ariolimax columbianus* Gould was collected from the base of a four to five foot, decomposed granite and stream deposited bank. No trees overhung the stream, but dead grass hung down approximately a foot over the bank. The mollusk had dug a concavity in the soil about two by six inches; the concavity possessed a roof composed of two decomposed granite rocks. Fecal masses in all stages of drying within the concavity and dried slime tracks around the burrow were observed. In the surrounding area fecal masses and slime tracks in various degrees of dryness were noted extending as far as fifteen feet from the retreat. This evidence and the fact that no other slugs were found in this vicinity supports evidence that this individual exhibited a homing instinct. This slug species apparently makes extensive foraging trips.

In the two slug concavities recorded, the sow bug, *Porcellio scaber* Latreille, was abundant crawling beneath the slugs, while in the surrounding areas they were rare. It is quite possible that such an association enhances the survival rate of sow bug populations throughout the dry season typical of this region of California. If the above animal association is further confirmed it is probably one of temporary commensalism.

It is suggested that the California slug collectors make use of the two types of "signs," fecal masses and slime tracks, in locating these animals. During a dry spell if these "signs" but no slugs are observed, a return to the same region during a rain will generally bring success in collecting. Slug "signs" have often been observed in Redwood Canyon behind Mills College, California, during dry periods. By marking the areas and returning to them during rainy periods many collections have been made.

In lower Redwood Canyon "signs" of *Ariolimax columbianus* Gould have often been observed on exposed roots of the live oak, *Quercus agrifolia* Née and *Sequoia sempervirens* Endl. "Signs" have been observed beneath wild blackberry bushes and on oak leaves on the alluvial land at the canyon's mouth. During the rainy season the slug has been seen in abundance crawling on oak leaf humus (*Q. agrifolia* Née) in east Oakland, California.

FRANK COLLINS BAKER

(December 14, 1867 to May 7, 1942)

Frank Collins Baker, President of the American Malacological Union, died on May 7, 1942, after failure to recover from a major surgical operation. Ever since 1894 he had been recognized as a leading figure in the study of Mollusca in the Middle West. In addition, he has been a very active worker in the fields of paleontology, ecology, archeology and museum administration.

Born on December 14, 1867, of pioneer colonial stock, he recalled shells among his earliest memories in the home of a seafaring grandfather. Through most of his life, shells and the animals which produced them continued to command his in-

terest. For the students of Mollusca, his continuous stream of smaller papers, from 1889 onward, was punctuated periodically by outstanding contributions such as his two volumes on the Mollusca of the Chicago Area (1898 and 1902); his monograph on the Lymnaeidae (1911); his studies on the Mollusca of Oneida Lake (1916–18); his Life of the Pleistocene (1920); his two monumental volumes on the Mollusca of Wisconsin (1928); and his Fieldbook of Illinois Land Snails (1939). He had completed the typed copy and drawings for one volume of what he considered as his *magnum opus*, a proposed two volume treatise on Planorbidae, based on an exhaustive analysis of comparative morphological details. He was in the midst of writing the second volume when the hand of death held him.

His early training he had secured at Brown University and as Jesup Scholar in the Philadelphia Academy of Sciences. Like so very many of the prominent museum specialists of an earlier generation, he secured broad experience in the Ward Natural Science Establishment of Rochester, New York. On June 12, 1892, he married Lillian May Hall, who died in 1934.

Baker came West to install the Ward display of Invertebrates for the World Columbian Exposition in Chicago and remained in the mid-west for the rest of his life except for the two years (1915–17) when he carried on ecological researches for the New York State College of Forestry.

In 1894, he became Curator of Zoology in the newly founded Field Columbian Museum. Later in that same year he accepted the post as Curator of the Chicago Academy of Sciences, an institution which he served faithfully and ably for 21 years. During this period, he made numerous contributions to museum methods and administration and carried on a continuous program of researches in the Academy where the names of men like Kennicott and Stimpson stood as background for his labors.

In 1918, he assumed the position as Curator of the Museum of Natural History in the University of Illinois, which he held until his retirement as Curator Emeritus in 1939. Retirement did not mark the close of his active career, for he continued to work on his research until the day he was stricken.

Through his entire career he has always held appointments wherein museum work and research were his direct obligations.

FRANK COLLINS BAKER

Yet by his scientific displays, his ambitious program of research, and his kindly interest in others, he exercised great influence upon students. He was never too busy to answer questions for students but he gave generously of his time to the public school children visiting the museum as well as to the graduate student seeking his assistance and mature advice on a research problem. As a result of his vision and his labors, the Museum in the University of Illinois has unparalleled values as an aid in science teaching at all levels.

Always interested in the history of the development of Malacology from the older science of Conchology, he has aptly written biographical sketches of the pioneers such as A. A. Gould, Robert Kennicott, William Stimpson, George Washington Tryon, and Victor Sterki for the Dictionary of a American Biography.

Those who knew him chiefly as a student of shells should not forget that his original researches on Pleistocene paleontology brought him wide recognition, including election as Fellow of the Geological Society of America and Fellow of the Paleontological Society.

In his relatively early studies he became deeply interested in the relation of animals to their environment and carried the ecological approach through most of his researches. In recent years responsibility for coordinating some programs of field studies in archeology stimulated his interest in ethno-conchology, and in this field he published several contributions.

The generous and kindly personality and the endless patience of Frank Collins Baker will long be remembered by those who came to know him, either professionally or personally.

H. J. Van Cleave

WILLIAM GAILLARD MAZŸCK

William Gaillard Mazÿck died at his residence in Charleston on July 24, 1942, at the age of ninety-five. He was the son of Alexander Harris and Emma Anna Gaillard Mazÿck and was born at Cordesville, South Carolina, October 12, 1846. Both of his parents were of Huguenot descent. On October 12, 1869, he married Miss Henrietta Vallee Ronan. They had four children, three of whom survive him.

In his early boyhood Mr. Mazÿck was educated in the private schools of Charleston but the economic changes brought about by the War Between the States put a stop to his formal education. As a boy and young man, Mr. Mazÿck was very delicate and for that reason was not able to join the Confederate Army. Instead, he was employed in the machine shops of the Northeastern Railroad (now the Atlantic Coast Line) in Charleston, moving to Florence, South Carolina, when the shops were transferred there during the War. At its close he returned to Charleston where for a time he was librarian of the Charleston Library Society. About 1869 he became a printer and, during this and the two years following, published a number of pamphlets and small books. In 1871 and 1872 he was a reporter for the Charleston Daily News, leaving newspaper work in the latter year to again enter the railroad service, this time as a clerk. But unsettled conditions soon necessitated curtailment in the office, and in 1876 Mr. Mazÿck was glad to secure work as a laborer, helping to lay street railway tracks.

In 1878 he went to work with the South Carolina Railroad Company as a clerk and in 1885 was made assistant treasurer of the Company, which position he held until 1895. In 1895 he helped to organize the Equitable Fire Insurance Company and served as it secretary and treasurer until 1933. When he died he was vice president and a member of the board of directors.

At the time of his death he was the oldest living member of the Sumter Guards and of Charleston's three oldest charitable and social organizations, the South Carolina Society, St. Andrew's Society, and St. George's Society. He was a charter member of the Huguenot Society of South Carolina and at one time was one of its vice presidents. He was a devoted member of the Episcopal Church.

Mr. Mazÿck was active in Masonry, being a past master of Landmark Lodge, No. 76, Ancient Free Masons, and was serving his fifty-third year as its secretary. He was also a past grand historian of the Grand Lodge and a past district deputy grand master of the First Masonic District and prelate of South Carolina Commandery No. 1, Knights Templars for many years before his death. In the Scottish Rite he had attained the degree of Knight Commander of the Court of Honor. In 1936, for out-

standing work in Masonry, he was presented with the first Albert C. Mackay medal to be coined under authority of the Grand Lodge of South Carolina.

He was deeply interested in the history of his native state. One of his proudest boasts was that he, as a boy of fourteen, had been the first person in Charleston to see the white flag going up over Fort Sumter when Major Anderson surrendered in April 1861. Another of his War-Between-the-States recollections was seeing Hunley's submarine unloaded from the freight car and being allowed to look inside of it and afterwards seeing it make a test dive under the Confederate training ship "Indian Chief" anchored in the Cooper River.

In March 1866 he joined the Elliott Society of Science and Art and was elected treasurer in November of that year; in 1868 he was appointed recording secretary and served in that dual capacity through the last regular meeting of the Society in 1891.

But Mr. Mazÿck's first love was conchology. As a boy of about eight he made the acquaintance of Dr. Edmund Ravenel, whom he spoke of as his conchological patron saint, and through whose influence he began his life-long interest in that science. He afterwards enjoyed the help and inspiration of Professor Francis S. Holmes and, later, of Professor Lewis R. Gibbes, both of the College of Charleston. He corresponded with conchologists in every country in the civilized world, among them being W. G. Binney, Thomas Bland, Dr. Lorenze G. Yates, John G. Anthony, J. G. Cooper, Dr. Louis Pytzyes of Belgium, Captain E. Caziot of France, and John Ponsonby of England.

He wrote extensively for the newspapers on historical subjects and contributed scientific papers to the Academy of Natural Sciences of Philadelphia, Nautilus, and the Elliott Society. He was the author of "The Charleston Museum, its Genesis and Development," 1908; "Catalogue of Mollusca of South Carolina," which was published as Contribution II from the Charleston Museum in 1913; "Waifs, 1865–1887," a collection of poems published in 1887 under the pen name of Charleton Dare; and "Biographical Sketches of Grand High Priests of the Most Excellent Grand Royal Arch Chapter of South Carolina."

On March 31, 1906, he was appointed by the trustees of the Charleston Museum, Honorary Curator of Conchology and he continued to hold that position until his death. When the Edmund Ravenel Collection of mollusks was given to the Museum, many years after Dr. Ravenel's death, it had suffered greatly from neglect and Mr. Mazÿck spent much time in reidentifying the specimens. He was a generous contributor to the Museum's collection.

His collection of shells, numbering some 170,000 specimens, is rich in land snails, in which he was especially interested. While Mr. Mazÿck collected many of the specimens himself, others were obtained through exchange with collectors throughout the world.

During his life time he was ever ready to help with the Museum's collections and problems and in his will he has left his splendid collection to the Museum. Emma B. Richardson.

WALTER LINCOLN BROWN, 1866–1942

Shell collectors all over the United States have lost a friend in the sudden passing of Walter Lincoln Brown, who died at Hermosa Beach, Calif., on Sept. 23, 1942.

Although his parents were Maine people, Mr. Brown was born in Watertown, Mass., in 1866. He had lived in Southern California for nearly 40 years and had been a member of the Conchological Club of Southern California since Sept. 1919.

Circumstances made it impossible for Mr. Brown to do a great deal of field work, but he exchanged widely, and for some years his place of business has been a gathering place for collectors of both shells and postage stamps. In both lines, beginners and those more advanced found him a helpful and generous friend.

Mr. Brown is survived by his widow, Mrs. Myra W. Brown, who has the sympathy of many friends in her loss.—Conchological Club of Southern California, Effie M. Clark, *Secy.*

NOTES AND NEWS

THE SOCIEDAD MALACOLOGICA "CARLOS DE LA TORRE" held its eighth session on Friday, Nov. 9, at the residence of Dr. Luis Sanchez de Fuentes, in the Vedado, Habana. An interesting programme included communications by Dr. Carlos de la Torre, Dr. Ricardo de la Torre, Dr. L. S. Fuentes, M. L. Jaume, Dr. Aguayo and Dr. A. Moreno.

REPRINTS OF SOME OF FRANK C. BAKER'S PAPERS are available. While the supply lasts, these will be sent gratis to those who request either by title of desired articles or by indicating the subjects of their interest, as: (1) Pleistocene Molluscs, (2) General works on Mollusca, (3) Ecology, (4) Snails, (5) Bivalves. Also, a few copies of the Monograph on Lymnaeidae (1911) are available at the reduced price of $3.50. Address requests to: 318 Natural History, University of Illinois, Urbana, Ill.

DR. WILLIAM A. BRYAN, Director of the Los Angeles Museum of History, Science and Art, died June 18, 1942, aged sixty-six. Dr. Bryan published a useful work on the fauna of Hawaii, which contained an account of the mollusks.

NOTES ON THE REPRODUCTIVE MORPHOLOGY OF THAIS.—It seemed desirable to eliminate sex as a factor in the morphological differences of the shells of *Thais floridana floridana* Conrad and *T. f. haysae* Clench, recently submitted to the United States National Museum for determination, by Victor Schechter of the United States Fish and Wildlife Service, at Pensacola, Florida. The typical subspecies was represented by 20 ♂♂ and 17 ♀♀ from Santa Rosa Sound, Pensacola, Florida; *haysae* by 12 ♂♂ and 14 ♀♀ from Baritaria Bay, Louisiana; all individuals of rather uniform external appearance in the respective subspecies.

No secondary sexual differentiation of the shell was discovered. Incidentally, however, the examination of these snails for sex revealed a very primitive condition. These animals of the genus *Thais* are fundamentally hermaphroditic; both male and female reproductive ducts are present in each individual. Sex differentiation of the individual is here functional, with the ducts of the opposite sex in an undeveloped or atrophied condition.

In the (functional) male, the verge is large, about ¾ to one inch long, somewhat like a thick ribbon, often partly coiled in a flattened helix (in preserved specimens). Its cross section is that of a flattened ellipse, and its distal end is simple, sharpened like the tip of a tent stake. Also present in the (functional) male is the rudimentary uterine canal, along the right edge of the mantle chamber, parallel to the rectum.

In the (functional) female individuals, the verge is very small, appearing usually as the size, shape, and color of a quarter inch piece of No. 40 white cotton thread, attached to the side of the neck behind the tentacles. In the (functional) female, the uterine canal is fully developed, glandular walled, elliptic to circular in cross section, with a slit-like lumen. In the preserved specimens it was seen as a prominent yellowish structure about 3 mm. in diameter, paralleling the rectum through the penultimate half turn.—J. P. E. Morrison.

Oreohelix East of the Mississippi.—The Shimek Collection of Loess fossil shells, now a part of the United States National Museum collections, contains one lot of shells that constitutes a hitherto unpublished record. This lot, U. S. N. M. No. 507846, contains six specimens of *Oreohelix strigosa iowensis* Pilsbry, from the Loess of Copperas Creek, Illinois, opposite Muscatine, Iowa. They were from the collection of F. M. Witter.—J. P. E. Morrison.

Abnormalities in *Helix* (*Alabastrina*) *tingitana* Paladilhe, and *Mesodon exoletus* Binney.—It was the writer's good fortune to find, some years ago, in the public markets, crates containing *Helix tingitana* Paladilhe and two of its varieties, *slessica* and *lacticolor* Pallary. These snails, as their crates indicated, came from Tunisia, North Africa. At first sight these mollusks might easily be mistaken for *Helix lactea* Mueller. The distinction, however, is easily made by observing the carinated whorls of the earlier parts of the shell, which sometimes, though rarely, persists to the penultimate whorl of the mature shell; also by noting the peculiar *dome-like* spire with its flattened whorls, giving the spire a more or less *evenly rounded* aspect, unlike that of *Helix lactea*, in which the whorls are rounded. The presence of *Helix tingitana* Paladilhe in this country evi-

dently escaped the notice of our naturalists. At any rate, it was the writer's privilege to call the attention of two of our great museums to them, and it was Dr. Henry A. Pilsbry who determined their name. So variable are these shells that anyone especially interested in structural and color variation in a species, would find this one quite to his purpose. Subspecies based on bands or their absence, on color, mottling, altitude of spire, or complanate form, might be made. Perhaps the variety-makers of Europe have done all this, so why add to the synonymy? Three mature snails of this species were kept for a while in a small vivarium, where eggs were laid and the young hatched, all of which had very sharp keels on the periphery. They were all colors and variously banded, and some were high-spired and some were low. They died when a few weeks old. Out of many hundreds of mature shells examined, six had abnormal dentiform plications within the aperture, on the columellar wall, just below the suture of the body of the whorl, and running parallel to and very close to the suture. They are always placed transverse, and are never axial. One wonders how many geological ages it would take for natural selection to make these "teeth" a normal characteristic, as in dentate *Polygyra*.

At the upper end of Ilion Gorge, near Ilion, New York, there is a deep, steep, narrow gorge or ravine, running down to the main gorge. It is walled with limestone, dripping with water, dank and cool. A little water-course runs down through it. Except for the road, crowded in between the creek and the high bluffs, it is still unspoiled, as God made it. It is alive with snails, especially *Mesodon exoletus* Binney. Out of several hundred found there, *two were sinistral*. The left-hand turn gives this snail a very strange aspect, as though it were an entirely different species. But, as with men, so with snails, some just happen to be that way.—William Henry Fluck.

In Nova Scotia.—In September 1932, in company with Dr. Reiner Bonde of the University of Maine Experiment Station of Presque Isle, Maine, we went up to the Bay of Fundy and we reached Hopewell Cape rock on the second day of September in the afternoon. The tide was very low. There are well-built steps leading down to the beach below, so we went down to see what might be found. Here the Petitcodiac River was heavily

laden with red mud which covers everything. At extreme low tide I noticed a small outcropping of rock, and to my great surprise I found in the rock crevices a good many *Thais lapillus* L. They are uniform, of a light yellow ochre color on the outside, and darker brownish purple inside, and are on the average 22 mm. in length. They were plentiful and I collected a large series. *Littorina litorea* L. were quite plentiful, but very small, like young specimens. *Littorina rudis* Don., one of ordinary size. *Acmaea testudinalis* Müll., specimen under rock slabs. In the mud below the ledge one *Macoma balthica*, a dead shell, and also a *Nassa*.

From Hopewell Cape we went up the Petitcodiac River to the Hillsborough gypsum mine. Here I found two living specimens of *Helix hortensis*, one the common yellow variety and one of the banded type. We then continued our journey and did not attempt to collect any more shells.—Olof O. Nylander.

Megalomastoma croceum (Gmelin) apparently requires a new synonym, which might be named in honor of Dr. Bartsch, and would serve to fill the vacuity between his "*Farcimen croceum*, height more than 30 mm."[1] and his consistently misspelled "*F. hjalmersoni*, height less than 20 mm."[1] The type male measures 24.9 by 10.3 mm., with 6¼ whorls remaining. The 11 males of the type lot average 25.2 mm. (23.1 to 27.4 mm.) and the 14 females 24.7 mm. (21.1 to 28.5 mm.) in height. The lot was collected Aug. 11, 1939, in coffee and sparse woods near and on the top of Montoso, alt. 2000–2500 ft., near Maricao, Puerto Rico. Because the peak of Montoso (or Montuoso), near the western end of the main range, is moderately dry and mainly cultivated, the local form of *M. croceum* burrows into the noncalcareous soil during dry weather, and, as a result, wears off its epidermis and polishes its shell so well that "axial ribs not strong" certainly applies, as it also does to the typical ecologic form from the limestone lowlands, where the shells usually do develop more whorls, but extensively intergrade with the Montoso lot.

A few miles from Montoso, in the Maricao Forest, the natural (or less disturbed) rain-forest accumulates heavy damp leaf-

[1] 1942, U. S. Nat. Mus. Bull. 181: 44, 45.

humus, so that *M. croceum*, of similar size, does not burrow, and thus retains not only its sharp growth-threads but also its epidermis, which varies from the "vicenti-cerea" of Pfeiffer's description of "*M. hjalmarsoni* Long. 15–21 mill." to dark chestnut. Thus, these last examples probably are more aberrant than Bartsch's "*Farcimen curtum*" from the moderately humid foothills of the Sierra Luquillo, although their sharp growth-threads should not be called "axial ribs strong." In any case, Dall and Simpson founded the name on a worn shell, and Hucares, their type locality, is on the lowlands, without limestone, not far from Humacao, where most of the shells are smallish (mine 24.7 to over 34 mm. long) and living adults vary from badly worn to retention of the growth-threads or even some of the epidermis.

Actually, Dr. Bartsch's namesake would be nothing new, since the best figure of the form *hjalmarsoni* and measurements of lots intergrading with typical *M. croceum* have been published by von Martens.[2] The latter's comments are still valid; only one species of the section *Neopupina* is as yet known from Puerto Rico and, on the basis of size or retention of sculpture, it is not even divisible into geographic subspecies. Because *M. croceum*, which includes Bartsch's 3 "species," inhabits both limestone and non-calcareous soils and ranges from semi-desert to moderate rain-forest, it varies greatly and, in fact, has developed some very striking ecologic forms, especially in the rich forests between Sierra Morales and the west end of the main range, where it does not need to burrow and wear itself down to the very bone. In size, it appears to reach its maximum on the mesophytic limestones of the northeastern lowlands, decreases slightly towards the drier limestones near the west end (mine from near Quebradillas measure 26 to 31 mm.), but shows the most marked decrease off the limestone and up the more humid mountains (my smallest, from the pass south of Adjuntas, measures 18 mm.).—H. Burrington Baker.

Do Hermit Crabs Inhabit Sinistral Shells?—In January, 1938, the writers visited Brigantine Beach, New Jersey, and found it covered with shells of the genus *Busycon*. About 50

[2] 1877, Jahrb. deutsch. malak. Gesell. 4: 341, pl. 12, f. 7.

specimens were taken, of which seven were sinistral. It was then noticed that while many of the dextral specimens were occupied by hermit crabs, all of the sinistral specimens were vacant. The explanation is, not that the hermit crabs are able to distinguish dextral shells and to select them by preference, but that the sinistral shells are all fossils that have been imbedded in indurated mud where the crabs do not have access to them. An interesting opportunity for research is suggested here. Are either of the sinistral species of *Busycon* from the south ever occupied by hermit crabs? And if so, do these crabs exhibit a reversal of axial asymmetry? And when in the course of their development they abandon their old shells to seek larger ones, do they select dextral or sinistral shells indifferently, or do they always select shells that are coiled in the same direction? The writers would be glad to hear from any Florida collectors about any observations they may make on hermit crabs in sinistral shells.—Joshua L. Baily, Jr., and Ruth Ingersoll Baily, 4435 Ampudia St., San Diego, California.

A MOMENTARY THOUGHT ABOUT THE WAR

How sad to hear these names in conflict tossed:
Mindanao—*Davao*—and *Celebes*,
Where Ares and Bellona weave their web.

One wonders what avails the awful cost
(In mollusc life as well as human life)
Of battles, with their carnage and their strife.

As mortals spend their energy above
The molluscs occupy themselves below
Building up islands with their cast-off shells
While men above endure a thousand hells
For countless hours trading metal shells
Far less aesthetic, more destructive far
Than any that one finds upon a bar
Of sand or on a beach, or in a cove.

Merrill Moore

THE NAUTILUS

Vol. 56 April, 1943 No. 4

OBSERVATIONS ON MARINE MOLLUSCA, WITH DESCRIPTIONS OF NEW SPECIES

By F. M. BAYER[1]

During the past several months, a number of interesting observations on marine mollusks, including some new species, have come to my attention as a result of dredging and shallow water collecting. Dredging was done off Virginia Key (Dade County), with W. A. Royce and Homer V. Geib, in July, 1941, and off Palm Beach (Palm Beach County) in 70 fathoms in September, 1941.

CYPHOMA INTERMEDIA Sowerby.[2] Plate 14, figure 27.

Previously, no student has had the opportunity to examine the living animal of this species, and consequently, for a considerable time its generic status was uncertain; because of its shell characters, it naturally alternated between *Cyphoma* and *Simnia*. A living specimen, which survived for a considerable time after capture, was taken from a gorgonian dredged from seventy fathoms off Palm Beach, and the following characters were noted:

Shell somewhat immature, but typical of the species, very pale flesh colored; mantle light buff, palest in the median area with a marginal dark strip, and another similar strip near its attachment to the body, heavily and regularly spotted with dark reddish brown; spotting less dense over the median light area, where the spots are a trifle diffused; edge of the mantle with a fine white border broadly but shallowly scalloped on the inside; siphon dark reddish brown, flared as in *Cyphoma mcgintyi* Pilsbry; foot, head, and tentacles a rather light brown or fawn color, the tentacles somewhat darker; foot the same color, with dark brown radiating stripes. The radula is typical for the genus, and is similar to *Cyphoma gibbosa*.

[1] Assistant Director, The Florida State Museum.

[2] Pilsbry, H. A., and T. McGinty, Nautilus 53: 1, p. 1.

PECTEN (CHLAMYS) MILDREDAE Bayer.[3]

In my original description of this shell, I considered it as a variety of the well known *Pecten imbricatus* Gmelin. After not a little additional study and consideration, I have deemed it advisable to raise this to full specific rank. I still believe, however, its nearest affinity to be *P. imbricatus*, as indicated by its similar scheme of ribbing (not number of ribs), its cupped scales, its external and especially its internal coloration, and the large size reached by adult individuals, as I have previously stated. The largest *Pecten sentis* rarely even approaches the size reached by a full grown *Pecten imbricatus* or *P. mildredae;* the commonest color phase of *P. mildredae* is the same as the usual color form of *P. imbricatus*, although it may also occur in brilliant red, purple, and pure white, as *P. sentis* does: this is as far as the similarity between these two goes.

PECTEN (LYROPECTEN) EULYRATUS, sp. nov. Plate 14, figure 28.

Shell small, subcircular, thin, compressed; auricles broad, unequal, byssal notch moderately large, with six teeth in the ctenolium; sculpture consisting of fifteen raised, somewhat squarish ribs on the upper valve; two or three radial threads in the interstices, and concentrically sculptured by very fine lines of growth; auricles with five or six radial striae; lower valve with sixteen squarish, elevated ribs, interstices a trifle smaller than the ribs; concentric sculpture of fine growth lines; auricles with about five rather broad radial riblets, finely squamose, crossed by lines of growth. Color dirty white, yellowish at the umbones and on the auricles, marked by zigzag lines and flecks of opaque, snowy white, and scattered fawn colored flecks; under valve obscurely but similarly marked. Alt. 20.5 mm., lat. 20.0 mm., diam. 5.0 mm., hinge line 15.0 mm.

Taken from Biscayne Bay (Dade County), Florida, by Mr. W. A. Royce, who probably has done more intensive collecting in this rich field than any other collector. The type is in his cabinet. This shell may be distinguished from the allied *Lyropecten antillarum* Récluz by its greater number of narrower, higher ribs, and somewhat greater compression.

PECTEN (LYROPECTEN) KALLINUBILOSUS, sp. nov. Plate 14, figs. 30, 31, 32.

Shell rather large, sub-circular, rather inequivalve, heavy; auricles broad, unequal; upper valve sculptured by fourteen

[3] Bayer, Ted, Nautilus, 55: 2, page 46, plate 3, f. 16, 17.

smooth, moderately broad ribs, the interstices between which are of slightly lesser width than the ribs; lower valve with the same number of ribs, in this case the interstices being a trifle larger than the ribs; concentric sculpture obscure, consisting merely of fine growth lines; auricles sculptured by rather fine radiating threads; byssal aperture rather ample, with five strongly developed teeth in the ctenolium. Color white, mottled and clouded with a rather light purplish brown, the marginal three-eighths being marked the heaviest; toward the umbones there is an indication of tawny yellowish, and three of the ribs on the upper valve are largely of this color: the central rib, and the third rib from it on either side. On the lower valve, which is lighter in color, the ribs are marked with a lighter purplish brown and the interstices are almost entirely white. The auricles are also white, marked with purplish brown and flecks of opaque white. The interior is white, with the dark exterior color showing through at the edges where the shell is thin. Alt. 36 mm., lat. 38.5 mm., diam. 15 mm., hinge line 27.5 mm.

Gulf of Mexico, off the region of Saint Marks, Florida, in about twenty fathoms, *fide* Joseph M. Hall, Sarasota. Type in his collection.

MUREX (POIRIERIA) MULTISPINOSUS Sowerby.

Recently, a specimen referable to this species was brought to my attention. This was collected from about two hundred meters of water off Japan. This record materially increases the range of the species, since it was previously known from Cebu, Philippines, only. The specimen agrees very nicely with the original description, but the figure of the type [4] shows a smaller aperture, rather lower spire, and longer canal. This might easily be the fault of the figure, for there is no point of separation in the description, which follows:

"Testa fusiformis, antice producta, postice conica, sordide albida; spira elato-conica, gradata, ad apicem papillaris, luteo-fusca, leviter obliqua; anfractus 6½, primi 1½ (apicales) laeves, rotundati, caeteri obtuse angulati, spiraliter obscure lirati, obtuse bicarinati, longitudinaliter undulatim eximie lamellati, varicibus 9–10 aculeatim spinosis instructi; anfractus ultimus supra convexus, infra rostratus; rostrum elongatum, rectiusculum, supra spinosum, infra laevigatum; apertura ovata, intus laevis. Long. 23, lat. 13 mm."

[4] Sowerby, G. B. Proceedings of the Malacological Society, volume VI, page 8, 1904–5.

Several Floridian marginellids have been contributing more than their share to the taxonomic miseries of the student of Florida mollusks, and have consequently led to no little confusion in identification. The name *Marginella carnea* has been used rather promiscuously to include several distinct forms.

Marginella carnea D. Humphreys Storer. Plate 14, figs. 17, 18.

"Shell oblong, of a beautiful flesh color; below the middle of the lowest whirl crossed transversely by a whitish band, commencing at the exterior margin of the right lip, and losing itself upon the columella: right lip thick, white, indistinctly denticulated within, and continued in mature shells to the apex of the spire, which it partially or entirely covers. Aperture narrowed. Four folds upon the columella. Inhabits Key West, near the United States Barracks." [5]

This is Doctor Storer's original description of this beautiful shell. In addition, the color is a rather orange shade, which fades out as the outer lip is approached. The callus from the outer lip is clear or white, and is not noticeable. Likewise it is very obscure on the columellar area. The species is found rather abundantly from the region of Cape Florida southward throughout the Florida Keys. The specimens illustrated are from the ocean side of Key Largo, near Dove Creek. Width, 10.75 mm., length, 18.00 mm.

Marginella amabilis John H. Redfield. Plate 14, figure 23.

"*M. amabilis* is larger and more elongate than *M. carnea*, and the rich flesh-colored tinge which the back of the shell exhibits, is arranged in three bands in the former, while in the latter only two are evident. The junction of the spire and lip is less shouldered in *M. amabilis*, and the lip is usually marked with two brown spots. In short, it is as closely related on the one hand to *M. oblonga* Swains. as it is to *M. carnea* Storer on the other, and has near affinities also to *M. guttata* Dillwyn." [6] Length, 0.75 inch,

[5] Storer, D. Humphreys, Boston Journal of Natural History, vol. I, article xxiv, page 465, plate 9, figures 3 and 4, 1837.

[6] Redfield, John H., Annals of the Lyceum of Natural History of New York, volume V, page 225, 1852.

(20 mm). Breadth, 0.46 inch, (12 mm). A very old, worn example measured 25 mm. long and 14 mm. broad.

The back of the shell is a rather light flesh color, not orange, as in the following species, *M. roosevelti*. The coloring of the dorsal region fades before the outer lip is reached. The callus is milky white, and the spire, although partly covered, is well produced. The illustrated specimen is from the collection of Dr. T. Van Hyning, of the Florida State Museum, and was taken in the Gulf of Mexico off the Cedar Keys.

MARGINELLA ROOSEVELTI Bartsch and Rehder.[7]

The shell is large, ovate and shining, with the dorsal part brilliant orange with two faint pale spiral bands. Shell marked by five reddish brown spots; one at the apex, one at the back of the columella a little above the lip, two on the outer lip, and one at the base. Length of type, 23.0 mm., major diameter 13.3 mm.

This species is broader than *M. amabilis*, and the spire is much lower. So far as I know, there have been no Florida examples taken, but specimens of *Marginella amabilis* have been confused with it, and so identified.

MARGINELLA OBLONGA Swainson.[8]

Shell somewhat pyriformly oblong, flesh colored, tinged and obscurely three-banded with fawn, spotted above and below, spire small, scarcely exserted, callous, whorls sloping at the upper part, then rather gibbous, more or less attenuated towards the base; lip thickened, white, indistinctly spotted with fawn red.

MARGINELLA EVELYNAE, sp. nov. Plate 14, figs. 24, 25.

Shell sub-pyriform, thick, rather heavy, highly polished; outer lip thickened, indistinctly denticulate within; spire scarcely produced, nearly or quite covered by a callus from the posterior angle of the outer lip; callus also reflected back on the body whorl from the outer lip to a distance of about 1 or 2 mm., encircling the anterior canal, and also covering the columellar face; very dark flesh color, almost a coral red, which is weakest at the columella, but which extends completely to the outer lip, which is white, and unspotted; the callus is yellowish; four plaits on the columella.

[7] Bartsch, Paul, & H. A. Rehder, Smiths. Miscell. Coll, Volume 98, number 10, page 5, plate 1, figures 2 and 3.

[8] Reeve, Lovell. *Conchologia Iconica, Marginella.* (Swainson, Zool. Illustr. ser ii, no. 9, plate xliv, f. 1.)

The type measures: Long. 16 mm., width, 10.5 mm., contained in the author's collection; paratypes in the collections of Mr. and Mrs. E. S. Vail, Daytona Beach, and W. A. Royce, Miami.

Holotype:	Length 16.0 mm.,	Width 10.5 mm.	
Paratype:	18.0,	12.0	Royce
Paratype:	17.5,	11.0	
Paratype:	17.0,	11.0	Vail
Paratype:	17.0,	11.0	Vail
Paratype:	16.0,	10.25	Vail

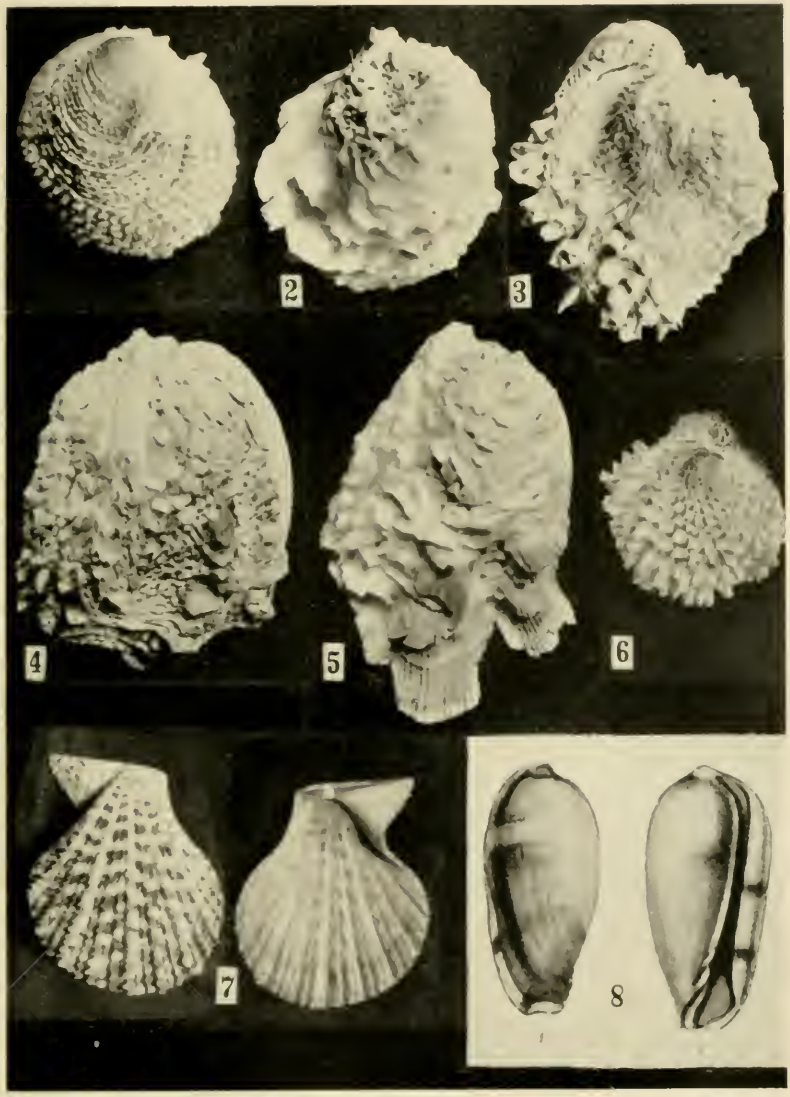
This table indicates the uniformity in dimensions of specimens of this species. All the specimens we have seen are from the type locality, Hillsborough Inlet, east Florida. *M. evelynae* differs from *M. carnea* in that it is more pyriform, darker, and lacking in the transverse white band of that species. Occasionally a hint of a paler zone is seen. The shell is named for Miss Evelyn E. Gross.

MARGINELLA NOBILIANA, sp. nov. Plate 14, figs. 19, 20.

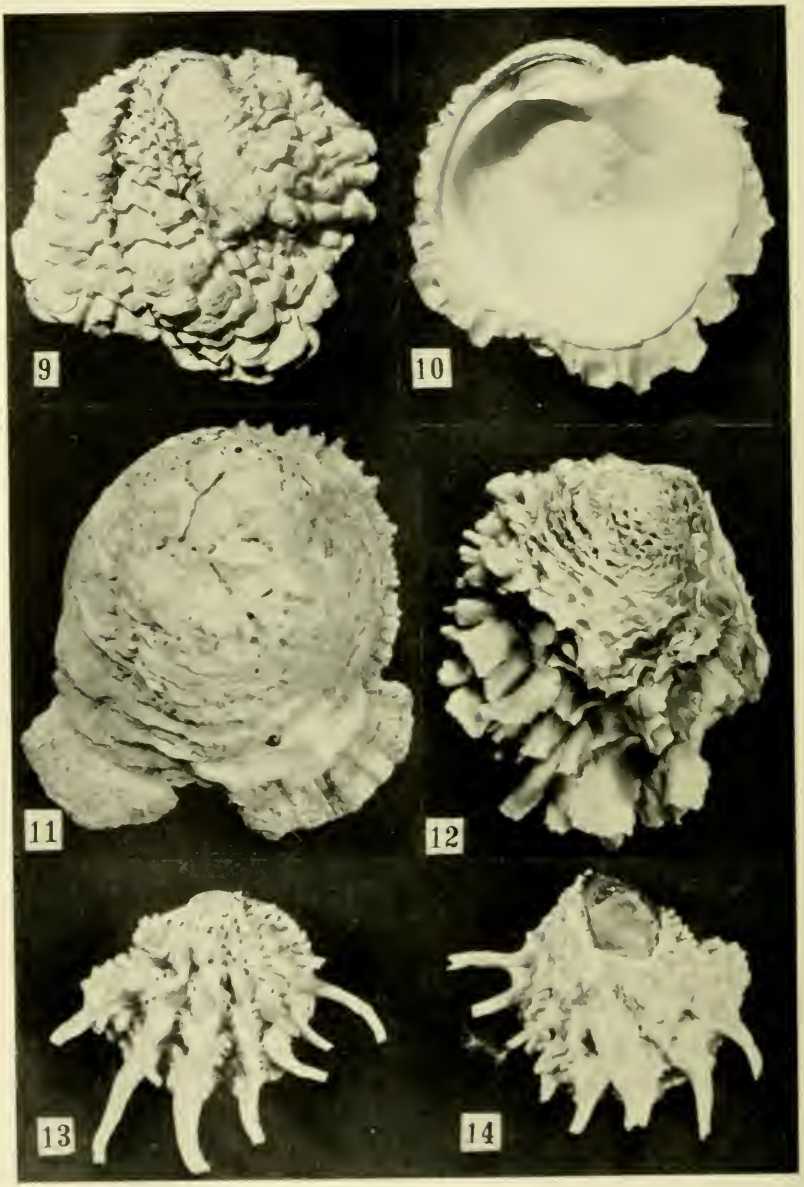
Shell slightly pyriform oblong, rather heavy, very highly polished; outer lip thickened, indistinctly denticulated toward the basal part; spire slightly exserted, partially or entirely covered by a pale fawn callus; callus 1–2 mm. wide reflected back from the outer lip, present but not noticeable on the columellar face, ill defined at its outer margin. Color dark flesh tint with one transverse whitish band anterior to the middle, and another, more obscure, at the shoulder; lip white, unspotted, callus white except at the apex and base, where it is pale fawn; the flesh color of the body whorl fades out to white before the outer lip is reached. Four distinct plaits are present on the columella. Length of type, 22 mm., width 13 mm.

The type was dredged from seventy fathoms off Palm Beach, Florida, and is in the author's collection; illustrated paratype from the collection of Dr. T. Van Hyning, The Florida State Museum, others in the Royce collection.

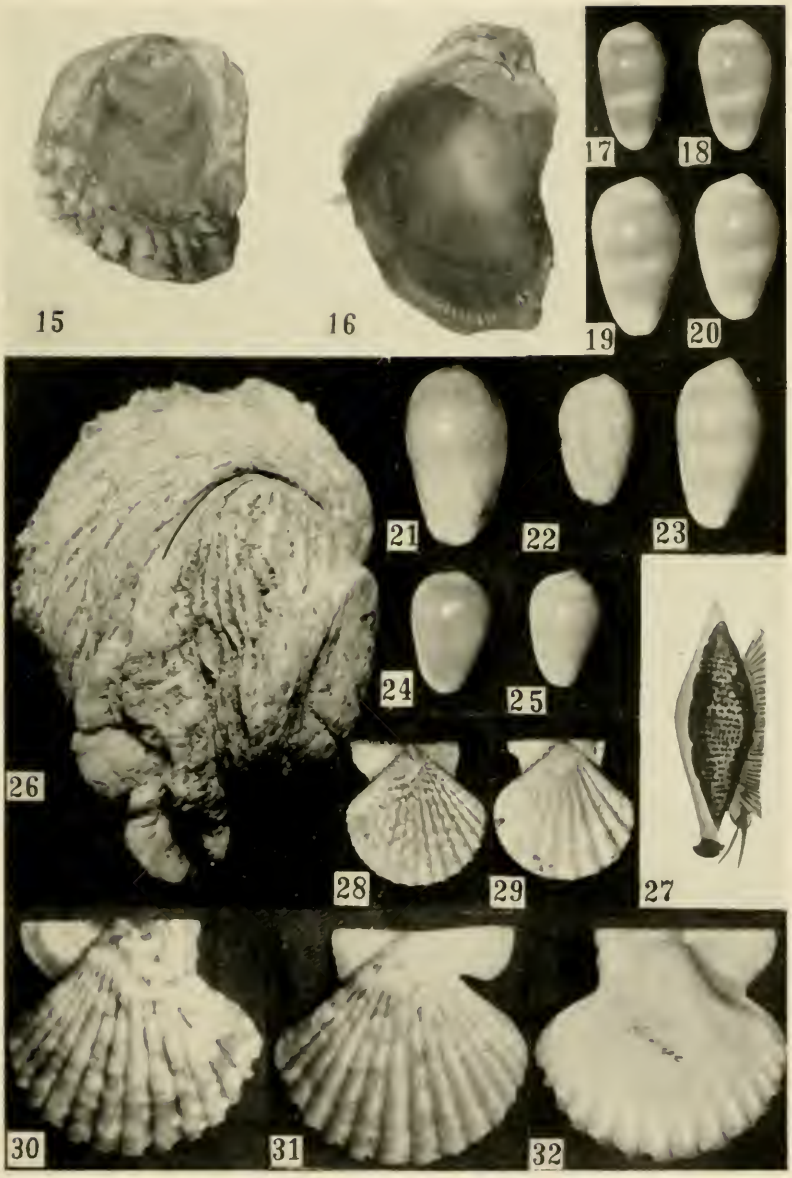
This species differs from *M. evelynae* in being consistently larger, with a much less pronounced shoulder, and consequently less pyriform shape. The color is somewhat lighter, and two whitish bands are present. From *M. carnea* it differs in color, being more pink, and in having two pale bands instead of one; in shape it differs in being larger and less slender. We have seen no specimens from shallow water. The species is named for Mr. Noble Mason. Measurements of the type lot are as follows:



Figs. 1, 2, *Chama lactuca*. Fig. 3, *C. congregata*. Fig. 4, *Pseudochama radians variegata*. Fig. 5, *Pseudochama* sp. Fig. 6, *Chama florida*. Fig. 7, *Pecten mildredae*. Fig. 8, *Marginella oblonga*.



Figs. 9, 10, *Chama sinuosa*. Fig. 11, *C. sinuosa firma*. Fig. 12, *C. macrophylla*. Figs. 13, 14, *Echinochama arcinella*.



Figs. 15, 16, *Chama sarda*. Figs. 17, 18, *Marginella carnea*. Figs. 19, 20, *M. nobiliana*. Figs. 21, 22, *M. guttata*. Fig. 23, *M. amabilis*. Figs. 24, 25, *M. evelynae*. Fig. 26, *Chama sinuosa bermudensis*. Fig. 27, *Cyphoma intermedia*. Fig. 28, *Pecten calyratus*. Fig. 29, *P. antillarum*. Figs. 30–32, *P. kallinubilosus*.

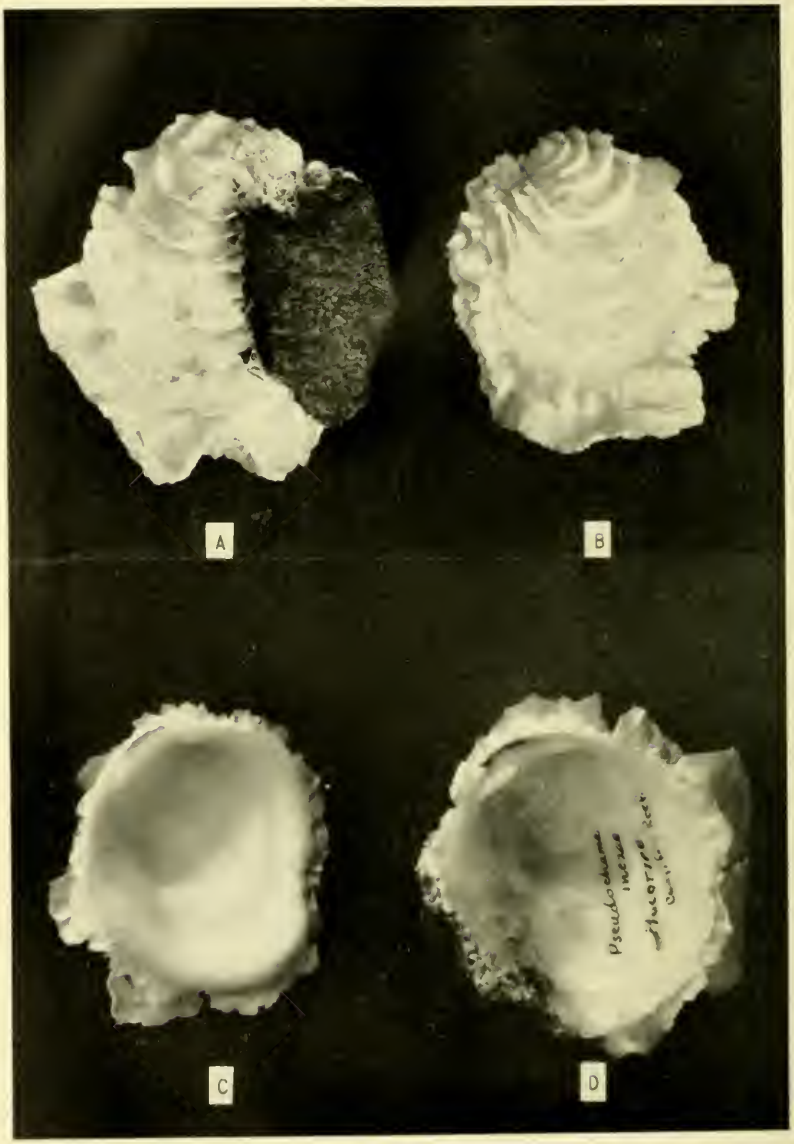


Fig. 33, a–d, *Pseudochama inezae*

Holotype:	Length 22 mm.,	Width 13 mm.	Palm Beach, 70 fath.
Paratype:	20	12	Lantana, 14 fath. (FSM)
Paratype:	21.75	13	Lantana, dredged (Royce)
Paratype:	20	12	Lantana, dredged (Royce)

There is apparently little variation in size and proportion in this species, other than that which would be normally expected. The paratypes were all dredged by Frank Lyman.

MARGINELLA GUTTATA Dillwyn. Plate 14, fig. 22.

The normal shell, as found in Florida and the Bahamas, is about 18 mm. long and 10½ broad, with the thickened lip and columellar plaits characteristic of the genus. The color is light pinkish fawn, obscurely bifasciate with a paler tint, heavily marked with irregularly scattered milky flecks 2 mm. or less in length. Several brown flecks are disposed as follows: two very light, nearly confluent spots at the angle of the outer lip near the posterior canal; one rather dark spot at the base of the outer lip, near the anterior canal; one rather dark spot about halfway between the two, on the outer lip; one rather heavy spot halfway between the median and anterior spots on the outer lip; and a flush of brown, often hardly amounting to a spot, on the callus which covers the side of the spire. The spire is only moderately exserted, and partially covered by a callus extended from the posterior termination of the outer lip. This species is found in moderate abundance on the ocean side of Key Largo, and elsewhere in the Florida Keys. There is a form of this species which is taken in deep water (see plate 14, fig. 21) that seems to be somewhat different from the typical form. It differs in being much larger, 25.5 mm. in length and 15 mm. broad, and in having the spire less exserted and more covered by the callus. The color is more of a lavender brown, with large white flecks, and an obscure bifasciation. The deep water form, while not sufficiently different to warrant separation, is still consistently enough so to deserve mention.

THE FLORIDA SPECIES OF THE FAMILY CHAMIDAE

By F. M. BAYER[1]

The chamas[2] have been in a state of confusion for quite some time. Pilsbry and McGinty's review of the group (Nautilus 51: 3, pp. 73) threw much light on the matter, but even at that time information concerning certain species and varieties was fragmentary or lacking. Until then, illustrations were, for the most part, poor, and positive identification was difficult or impossible.

Many kindnesses were extended the author in this work, and especial thanks are due Dr. F. G. Walton Smith, Department of Zoology, the University of Miami; Director T. Van Hyning, of The Florida State Museum, in whose Section of Comparative Florida Mollusca the species discussed herein are contained; Alfred H. Patterson, of Miami; and Mr. and Mrs. James Donovan, of Norfolk, Virginia.

A large series of examples of all the species from both coasts of the state, as well as the Keys and Tortugas, was examined. The greater part of the material used as a basis for this study was collected from Carysfort Reef by A. H. Patterson, and from Biscayne Bay by Noble Mason and the author. Photographs are by Bob Vollmer, Miami; Trent Rogers, Gainesville; and C. C. Sherley, Miami.

While working over the large series of shells collected for this work, and many from private collections as well, some observations of unusual interest were made. From the observed material of the genus *Pseudochama*, *P. radians variegata* is certainly not the only one of its genus to be found in the Florida area, as has been supposed. One species turned up by Mr. Patterson forms a striking addition to the Florida mollusk fauna, and although there are some West Indian species described that might easily be found in this area, the new shell is not likely to be confused with any of the possible indigenes not now confirmed as Floridian. This species entirely lacks the marginal crenulation typical of the other

[1] The University of Miami, Coral Gables, and *Assistant Director*, The Florida State Museum, Gainesville.

[2] The word *Chama* comes from the Greek, meaning a gaper, and is pronounced *kā'-ma*.

Pseudochama species of Florida, and has an entirely different type of sculpture. In addition, another species of *Pseudochama* was collected at Palm Beach Inlet which does not satisfactorily fit in with any of the known forms. Unfortunately, due to lack of adequate material, this species cannot be placed properly at the present time. Despite this fact, I have, however, included it in the key, since it is my desire to have this key as complete as possible, and yet avoid revising it entirely at a later date. Information concerning it will be published as soon as time allows. A figure is given herewith (fig. 5).

Key to the Florida Species of the Family Chamidae:

1. Shell usually free when adult; nearly equivalve, lunule well developed; long, erect tubular spines on radiating costae: *ECHINOCHAMA arcinella* Linne.
   Shell usually attached when adult, very inequivalve, no lunule; flattened foliations, not tubular spines: .....(2)
2. Apex of free right valve turning in a counterclockwise spiral: Genus *CHAMA* (3)
   Apex of free left valve turning in a clockwise spiral: Genus *PSEUDOCHAMA* (10)
3. Interior margins of valves crenulate: .....(4)
   Interior margins of valves not crenulate: .....(8)
4. Pallial line passing around anterior end of anterior adductor scar, and joining it anteriorly; red markings, if present, are spots: .....(5)
   Pallial line not passing around anterior end of anterior adductor scar, but joining it posteriorly; red markings are blotches which more or less cover the surface, sometimes entirely: .....*Chama sarda* Reeve.
5. Shell usually about 50 mm. in diameter when adult; profusely sculptured with broad foliations; color, yellow, purple, or white: .....*Chama macerophylla* Gmelin.
   Shell usually 35 mm. or less in diameter when adult: ....(6)
6. Foliations profuse, concentric, no radial corrugation: ....(7)
   Foliations scant, scattered; radial corrugation more or less prominent: .....*Chama congregata* Conrad.
7. Sculpture of upper and lower valves similar; fluted foliations rather widely spaced; several radial series of red or pink spots: *Chama florida* Lamarck.
   Sculpture of upper and lower valves dissimilar; foliations of upper valve relatively short, closely spaced; lower valve having concentric ruffles not divided into foliations; white, with livid brown radial streaks: .....*Chama lactuca* Dall.

8. Broad, cupped, striate foliations; one, sometimes two radial furrows from umbo to posterior basal area of the free valve; shell not excessively heavy: ..... *Chama sinuosa* Broderip.
   Few, if any, foliations; sculpture effaced; radial furrow weak or obliterated; shell heavy: .....(9)
9. Shell with attached valve not excessively deepened, but very thick and heavy:
   Chama sinuosa firma Pilsbry and McGinty.
   Shell with lower valve very deep, and spirally coiled; very heavy, sometimes unattached:
   Chama sinuosa bermudensis Heilprin.
10. Interior margins crenulate; radially corrugate exterior; shell colored, especially on the fronds: .....(11)
    Interior margins not crenulate, but finely shagreened; broad, raised concentric ruffles not cut into fronds; color pure white:
    Pseudochama inezae, n.sp.
11. Flattened, sometimes striate foliations, no spinelike processes; radially corrugate; color, white more or less marked with lavender: *Pseudochama*, species indet.
    Short, spinelike, or somewhat flattened foliations usually but not always present; strongly radially corrugate; color whitish, marked with maroon or red-brown:
    Pseudochama radians variegata Reeve.

ECHINOCHAMA ARCINELLA Linnaeus. Plate 13, figs. 13, 14.

Shell usually free when adult; equivalve, with about fifteen radial costae bearing erect tubular spines, which are very long in young specimens, but often worn down in adults. The interstices between the ribs are pitted; remnants of a thin, light brown periostracum may occasionally be seen in the lines left by growth pauses. The possibility that the Florida race of *E. arcinella* may prove to be subspecifically different from the typical West Indian form, as suggested by Pilsbry and McGinty, seems to rest on the larger size and greater number of ribs of the latter. Some Florida specimens examined seem to indicate that the general run of Florida specimens have not reached the maximum size, and that the number of ribs on the under-sized individuals is increased by intercalation as growth proceeds, until maximum size, and the typical number of ribs, is arrived at. The young specimen shown in our photograph possesses only seven ribs, while an ordinary, normal, Florida specimen (35 mm.) has nine, with two or three introduced, and a larger specimen (45 mm.) has thirteen, several

of which were introduced by intercalation. When the maximum size is reached, the ribs number fifteen or sixteen, more or less.

Julia Gardner[3] considers *Echinochama* as a subgenus of *Pseudochama;* indeed, *Echinochama* follows the characters of *Pseudochama* in attaching by the right valve, and in hinge construction. However, most of the recent authorities give *Echinochama* full generic rank, and I follow that decision.

Range: North Carolina to the West Indies. *Records:* St. Marks, northwest Florida, 20 fath. (J. M. Hall); Lake Worth (Bayer); Marco (Royce); Naples (Van Hyning).

Chama sarda Reeve. Plate 14, figs. 15, 16.

The shell is rather small, snow-white, with stains of brilliant red more or less covering the upper valve, sometimes completely, leaving only the flattened spines white. The attached valve is usually deep pink or red internally, pinkish and white externally. There is sometimes a slight radial corrugation on the upper valve; the internal margins are sharply crenulate, and the pallial line joins the anterior adductor scar at the nearest point. It is distinguished from *Chama florida* by its irregular foliation, its radial corrugation, and more or less widespread red staining. It is apparently an uncommon shell in Florida, although numerous lower valves were once to be seen on the rocks at Jupiter Inlet, east Florida, and a few at Palm Beach. The rocks at Palm Beach were dredged from the channel, and the top valves were all lost before any collecting could be done. Mr. Patterson collected the specimen illustrated on our plate, and the one in the author's collection, from Carysfort Reef. *Range:* East Florida, Florida Keys, and West Indies. *Records:* Palm Beach Inlet (Bayer); Carysfort Reef (Patterson); Lantana, Florida, 40 fathoms, and Ocean Ridge, Florida, 40 fathoms (Lyman).

Chama macerophylla Gmelin. Plate 13, fig. 12.

Shell profusely foliate with flattened, striate fronds, which vary in development in accordance with the habitat of the individual. The exterior color may be yellow with a few red spots under the fronds, various shades of purple, or pure white. Occasionally specimens are seen which are white and yellow, white and purple,

[3] Gardner, Julia: U. S. Geol. Sur. Professional Paper 142 B, p. 95. 1926.

or yellow and purple, and these combinations are unusually beautiful. The interior margins are crenulate, and the pallial impression passes around the end of the anterior adductor scar before joining it anteriorly. It is the most abundant, and most easily recognized of the Florida Chamas. *Range:* Florida to the West Indies. *Records:* Lake Worth; Biscayne Bay (Mason and Bayer); Old Rhodes Key (Lyman); Tortugas, Garden Key (Russel); Marquesas (Van Hyning); Sarasota, 5 fath. (Royce).

Chama congregata Conrad. Plate 12, fig. 3.

This is one of the smaller species, whitish with tawny or maroon corrugations and prickles; the interior is white, usually stained with brown. The inner margins are markedly crenulate, and the pallial line proceeds around the anterior adductor scar, and joins it at the outer margin. It is easily recognized by its nondescript color, radial corrugation, and scanty foliation. The specimen figured is a rather large individual from Palm Beach Inlet, collected by Mr. and Mrs. Donovan. *Range:* North Carolina to the West Indies. *Records:* Palm Beach Inlet (Donovan); Biscayne Bay (Mason and Bayer); Fort Walton (Lyman); Big Pass, Sarasota (Royce).

Chama florida Lamarck. Plate 12, fig. 6.

The shell is rather small, subcircular, with concentric rows of fine, rather elongate, fluted foliations. The ground color is white, with several radial rows of deep pink or carmine spots, which give the shell a striking appearance. The interior of both valves white, the upper pink stained. The interior margins are crenulate, and the pallial line passes around the end of the anterior adductor scar, and joins it at the anterior end. The species is often so covered with the common encrusting agencies that it is quite unrecognizable. The specimen shown comes from Carysfort Reef. *Range:* South Florida to the West Indies. *Records:* Biscayne Bay (Donovan); Soldier Key; Carysfort Reef (Patterson); Garden Key, Tortugas, (Russel).

Chama lactuca Dall. Plate 12, figs. 1, 2.

In this species, the sculpture of the upper and lower valves is entirely different. The upper valve has rather short, concen-

trically arranged foliations closely set upon its surface, each frond grooved beneath. The color is dirty white, streaked with brown. The lower valve has sharp, raised concentric ruffles, which are fluted here and there, but not divided. The color is dirty white. The inner margins of the valves are finely crenulate, and the pallial impression passes around the anterior adductor scar, joining it at the anterior end. It is a shell of deeper water, found from ten to one hundred fathoms. The figured shell is from the collection of Mr. and Mrs. Donovan, and was taken at Palm Beach in 10 fathoms. *Range:* North Carolina to the West Indies.

Chama sinuosa Broderip. Plate 13, figs. 9, 10.

Shell large, not very heavy, sculptured with radially striate, cupped fronds arranged in concentric series; a deep furrow runs from the umbo to the posterior basal margin of the free valve, and a weaker furrow may run to the anterior basal margin. (In older specimens, the young shells have the sulci rather close together, when two are present, and these diverge as maturity is reached, causing large specimens to appear three-parted.) The interior margins are smooth, and devoid of any crenulation. Color dirty white, cream, or pale fawn, with a reddish brown spot at the base of, and another beneath, the majority of the fronds; each frond lightly sprinkled with tiny spots of brown arranged on the radial striae; the furrow (or furrows) on the upper valve may be dark brown, and the adjacent fronds are also touched with brown. The interior is white and china-like.

Chama sinuosa is probably the finest east American *Chama*, beautiful alike in coloration and sculpture. The specimen on our plate, in the Van Hyning collection, is a very fine shell, dredged from 40 fathoms off Yamato, east Florida, by Frank Lyman. Specimens from shallow water do not have such deep color, and the spines are apt to be more flat and spreading than cupped. *C. sinuosa* and its varieties may always be distinguished by the smooth inner margins.

Chama sinuosa firma Pilsbry and McGinty. Plate 13, fig. 11.

The outstanding difference between this and the typical *sinuosa* is the effaced sculpture and increased thickness and weight. I am inclined to agree with its authors in their suggestion that *firma* is an ecologic form. All the same, a name for such well defined forms is convenient. The shell shown on the accompanying plate

was collected from a somewhat sheltered situation on Garden Key, Dry Tortugas, and consequently, a few marginal folia are developed. *Range:* Boynton (Palm Beach County) Florida, to the Tortugas.

Chama sinuosa bermudensis Heilprin. Plate 14, fig. 26.

Shells referable to this subspecies have been taken from the moat surrounding Fort Jefferson, Garden Key, Dry Tortugas. The shells are similar to the heavy *C. s. firma*, but differ in having extremely spirally coiled and cupped lower valves, and deeper upper valves as well. Most specimens are heavily incrusted by thick, limy deposits, which form excellent boring-grounds for boring worms and mollusks, such as *Gastrochaena*. The illustrated shell is from the Van Hyning collection, and was collected on Garden Key. *Range:* Bermuda and the Tortugas.

Pseudochama radians variegata Reeve. Plate 12, fig. 4.

As a general rule, this is one of the smaller species, although large individuals are not uncommon. The sculpture is usually rough and unlovely, consisting of stubby processes and points, radial corrugations, and concentric growth marks. The color is usually dirty white, marked with reddish brown or maroon, the interior white, more or less stained by the color of the outside, especially at the margins. There is a noticeable crenulation of the inner borders. The shell on the plate was collected from Biscayne Bay by Noble Mason.

Pseudochama inezae, sp. nov. Plate 15.

Shell rather large, subcircular, very thin and light; attached by the right valve; hinge teeth weakly developed; sculpture of about eleven flared, concentric ruffles, which are very thin and irregularly margined, but not cut into fronds. The marginal frills are radially striate, and somewhat fluted, recurved a little downward on the upper valve. The interior margins lack any crenulation, but are finely shagreened at the edge, especially on the lower valve. The shell is pure, alabaster white, with no trace of coloring whatsoever. Greatest diameter, 42, least, 38 mm.

The illustrated type was collected by Mr. Patterson from the wreck of an old steamship, which rested in about ten fathoms, off Carysfort Reef. It is named for Mrs. Patterson.

The chamas are, at best, an inherently difficult and somewhat confusing group. Their great variation is a result of widely varying local conditions, such as water purity, food supply, protection from weathering effects, and dozens of other factors for each specific locality. The same species from two localities, perhaps only a few yards distant, may differ from each other to a greater degree than do two totally different but related species from the same place. In utilizing the accompanying key, these factors must be kept in mind in order to arrive at accurate identifications. Undoubtedly new information will continue to be forthcoming, as new material is collected, and relationships will become increasingly clearer.

Explanation of Plates 12 to 15

Plate 12. Fig. 1, *Chama lactuca* Dall; diam. maj. 11, min. 10 mm.; upper valve, off Lantana, Fla.; photograph by Bob Vollmer. Fig. 2, same, lower valve; diam. maj. 12.5, min. 11 mm.; photo by Vollmer. Fig. 3, *Chama congregata* Conrad, dorsal view; diam. maj. 28, min. 26 mm.; Palm Beach Inlet; photo by Vollmer. Fig. 4, *Pseudochama radians variegata* Reeve, upper valve; diam. maj. 41, min. 32 mm.; Biscayne Bay; photo by Vollmer. Fig. 5, *Pseudochama* sp.; Palm Beach Inlet; photo by Vollmer. Fig. 6, *Chama florida* Lamarck, dorsal view; 22 mm.; Carysfort Reef; photo by Hi-Tone. Fig. 7, *Pecten mildredae* Bayer, exterior and interior of upper valve; alt. 35, lat. 30 mm.; photo by Rogers. Fig. 8, *Marginella oblonga* Swainson; 23 mm.; original illustration, copied by Hortense Christensen.

Plate 13. Fig. 9, *Chama sinuosa* Broderip, exterior of upper valve; diam. maj. 68, min. 63 mm.; photo by Hi-Tone. Fig. 10, same, interior of lower valve; diam. maj. 66, min. 65 mm. Fig. 11, *Chama sinuosa firma* Pilsbry and McGinty, upper valve; diam. maj. 54, min. 38 mm.; Garden Key, Tortugas; photo by Vollmer. Fig. 12, *Chama macerophylla* Gmelin, upper valve; diam. maj. 44, min. 33 mm.; Biscayne Bay; photo by Vollmer. Fig. 13, *Echinochama arcinella* Linnaeus, left valve; diam., excl. spines, maj. 15, min. 13 mm.; young shell from Lake Worth; photo by Vollmer. Fig. 14, same; right valve.

Plate 14. Figs. 15–16, *Chama sarda* Reeve; 25 mm.; Carysfort Reef; photo by Hi-Tone. Figs. 17–18, *Marginella carnea* D. H. Storer; long. 18 mm.; photo by Rogers. Fig. 19, *M. nobiliana*, n. sp., Type; long. 22, lat. 13 mm.; photo by Rogers. Fig. 20, same; long. 20, lat. 12 mm.; paratype. Fig. 21, *M. guttata* Dillwyn, var.; long. 25 mm.; photo by Rogers. Fig. 22, same; long. 18 mm.; photo by Rogers. Fig. 23, *M. amabilis* Redfield; long. 24 mm. Fig. 24, *M. evelynae*, paratype; long. 17.5 mm.; photo by Rogers. Fig. 25, *M. evelynae*, n. sp., Type; long. 16, lat. 10.5 mm.; photo by Rogers. Fig. 26, *Chama sinuosa bermudensis* Heilprin; oblique view; photo by Rogers. Fig. 27, *Cyphoma intermedia* Sowerby, drawing from life. Fig. 28, *Pecten eulyratus*, sp. nov., type, upper view; alt. 20.5, lat. 20.0 mm.; photo by E. H.

Bone. Fig. 29, *P. antillarum* Recluz; photo by Bone. Fig. 30, *Pecten kallinubilosus*, sp. nov., type, upper valve; alt. 36, lat. 38.5 mm.; photo by Rogers. Fig. 31, same, lower valve. Fig. 32, same, interior of upper valve.

Plate 15. Fig. 33, *Pseudochama inezae*, n. sp., Type; diam. maj. 42, min. 38 mm.; all figs. by Mr. Charles C. Sherley. a, Exterior of right valve. b, Exterior of left valve. c, Interior of left valve. d, Interior of right valve. The fine shagreen surface, or granulation, is easily seen at margins of shell in fig. d; present but not noticeable in c.

A PRELIMINARY REVISION OF THE RECENT SPECIES OF CHINESE VIVIPARIDAE [1]

By TENG-CHIEN YEN

One of the most comprehensive monographs of Viviparidae is Kobelt's work, in continuation of Kuester's, on "*Paludina* Lam.—*Vivipara* Montf.," which was issued at different intervals during 1906–1909 in the new edition of Conchylien-Cabinet by Martini and Chemnitz. This work has practically included all the forms of the family known to the author at that time. Since then, this group of freshwater mollusks was subsequently studied by a number of authors, notably Annandale (1920, 1921, 1924) and Rao (1925, 1928), whose attention was particularly directed to the Asiatic forms; Prashad (1928) presenting a synthetic study in distribution and evolution of both recent and fossil Viviparidae; and Kuroda (1929) on the classification of the Japanese forms.

But, nevertheless, a revised synopsis of the family in generic and minor divisions was not available till the publication of the first part of Thiele's "Handbuch" in 1929. Later on in 1936, Taki also attempted to present a "Revision of System of Viviparidae," but his "revision" does not seem to make any important change other than reducing a few of Thiele's subgenera to sections (*Bellamya* Jousseaume, *Dactylochlamys* Rao = *Angulyagra* Rao, *Heterogen* Annandale, etc.) and his genera into subgenera (*Rivularia* Heude, *Margarya* Nevill, *Neothauma* Smith and *Tulotoma* Haldeman). Such changes do not seem to offer a better background for further study of the family and sometimes may cause confusion.

[1] This work was done with a grant-in-aid from the American Philosophical Society in Philadelphia, Pa.

However, an important contribution by Rohrbach, which casts new light on the revision of Viviparidae, came to our attention in 1937. On the basis of a comparative study of *Bellamya unicolor* and its allied forms, the author was led to the conclusion that these African forms should be separated from the typical *Viviparus*, and they show close relationship to the species of *Cipangopaludina*.

In the following pages I attempt to arrange the species of Viviparidae so far known from China into their proper genera. Most of these species has been hitherto assigned to *Viviparus* (s. l.), although the attention has been called previously, for a few of these forms, by Annandale, Rao, Prashad and others, that they should be separated from the typical *Viviparus*. Moreover, all the genera comprised in the present work have been generally accepted by recent authors, and their generic ranks seem to be well established.

In addition to the 68 species and subspecies treated in this work, there are two more forms which can only be considered as doubtful in generic position. One is *Paludina deformis* Heude 1890 (Mem., p. 130, pl. 25, fig. 8–9), another is *Paludina heudei* Ping 1938 (Bull. Mus. Heude, Malac., I (5), p. 2, pl. 1, fig. 1–2, non Dautzenberg et Fischer 1905).

Genus VIVIPARUS Montfort, 1810, Conch. Syst., II, p. 247.
Genotype: *Helix vivipara* Linné.

The genus is used here in *sensu stricto* which has been hitherto used in *sensu lato* for many of the Chinese species. More closely related species of this kind may be represented by a few comparatively small-shelled and banded forms found in the northeastern provinces of China. These forms were formerly supposed by authors to be more closely related to *Cipangopaludina chinensis* (Gray) or *Bellamya quadrata* (Benson), but they are different from the former by the smaller size and thicker shell substance, and from the latter by the more roundly convex whorls, destitute of spiral sculpture and peripheral keel. These forms seem to resemble closely such species as *V. viviparus* and *V. contectus* which exist so commonly in Europe as far as to western Siberia. These forms are often banded but the color bands are sometimes absent or only faintly traceable inside of the aperture. The apical whorls, as often well preserved in the young but decollated

in the adult, are rather depressed or nearly flattened, never being mucronate as that of the species of *Cipangopaludina*. Two species are at present known and their geographic range does not seem to extend further south than Kirin province.

Viviparus praerosus (Gerstfeldt 1859)—Amur region
V. chui Yen 1937—Kirin, Kirin province

Genus BELLAMYA Jousseaume, 1886, Bull. Soc. Zool. France, XI, p. 478. Genotype: *Paludina bellamya* Jousseaume.

A number of Chinese species which has hitherto assigned into *Viviparus* (s. l.) or a group called "*Vivipari Dissimiles*," seems to be well included into *Bellamya*. As already pointed out by Rohrbach in 1937, this group is different from the typical species of *Viviparus*, and the relationship among *B. unicolor, dissimilis* and *quadrata* was well discussed by Prashad in 1928 (p. 180).

Moreover, it differs from other genera such as *Cipangopaludina* and *Angulyagra* by its more or less oblong outline of shells, smaller size, obtusely or strongly keeled at the periphery, thinner columellar margin and having scarcely convex or rather flattened whorls.

Bellamya quadrata (Benson 1842)—Chow-shan Island, Chekiang
Syn. *purificata* Heude 1890—Siang river, Hunan
chengtehensis Taki 1936—Chengteh, Jehol
B. quadrata minor (Nevill 1885)—Kulangsu, Amoy, Fukien
B. q. reevei (Dautzenberg et Fischer 1905)
Syn. *quadrata* Reeve, non Benson,—Shanghai, Kiangsu
B. q. boettgeri (Heude 1890)—Hainan Island, Kwangtung
B. q. orientalis (Lea 1860)—China
Syn. *aeruginosa* Reeve 1863—Canton, Kwangtung
B. q. turrita (Yen 1939)—Canton, Kwangtung
B. q. ecarinata (Kobelt 1906)—north river, Canton, Kwangtung
B. q. acutecarinata (Kobelt 1906)—Canton, Kwangtung
B. q. dispiralis (Heude 1890)—Yunnan
B. q. fantozatiana (Heude 1890)—upper Han river, Hupei
B. q. lapillorum (Heude 1890)—Ningkuo-hsien, Anhwei
B. q. heudei (Dautzenberg et Fischer 1905)
Syn. *aeruginosa* Heude, non Reeve,—Yangtze valley
Bellamya lithophaga (Heude 1889)—Ningkuo-hsien, Anhwei
B. demolita (Heude 1890)—Kwangtuh, Anhwei
B. smithi (Yen 1942)—Hunan
B. limnophila (Mabille 1886)—Ta-li-fu, Yunnan
B. secernenda (Mabille 1886)—Ta-li-fu, Yunnan
B. margaryoides (Annandale 1924)—Ta-li-fu, Yunnan

Genus CIPANGOPALUDINA Hannibal, 1912, Proc. Malac. Soc. Lond., X, p. 194. Genotype: *Paludina mallcata* Reeve.

The name was proposed by the author as a subgenus of *Idiopoma*, and its description was based on several lots of "introduced" specimens collected in California which were identified as *P. mallcata* Reeve. In 1920 Annandale proposed *Lecythoconcha* as a distinct genus for *Paludina lecythis* Benson and its allied forms, which, as pointed out by Prashad 1928, fall into the same group of species for which *Cipangopaludina* was described. The former has thus invalidated the latter. It was treated as a section of *Viviparus* by Thiele.

The generic characters were well described by Annandale 1920 for *Lecythoconcha* (Rec. Ind. Mus., p. 114) and subsequently by Rao in 1925 (Rec. Ind. Mus., p. 133) and in 1928 (ibidem, p. 421). It has a wide distribution in Eastern Asia as far west as Burma and Northern India and it was introduced into North America. The following forms have been described from China:

Cipangopaludina chinensis (Gray 1834)—China
Syn. *leucostoma* Heude 1890—Peihai, Kwangtung
diminuta Heude 1890—Kwangtch, Anhwei
C. chinensis hainanensis (Kobelt 1906)—Hainan Island, Kwangtung
C. c. stelmaphora Bourguignat 1862—Peking, Hopei
C. lecythis (Benson 1836)—Yunnan
C. lecythoides (Benson 1842)—Chow-shan Island, Chekiang
C. l. fluminalis (Heude 1890)—Yangtze valley
C. l. aubryana (Heude 1890)—Kwei-chow
C. l. occidentalis (Annandale 1924)—Yunnan
C. ventricosa (Heude 1890)—Kwei-chow and Yunnan provinces
C. v. cathayensis (Heude 1890)—Yangtze valley
C. v. wingatei (Smith 1900)—Hunan
C. v. patris (Kobelt 1906)
Syn. *lecythoides* Heude, non Benson, Chow-shan Island, Chekiang
compacta Kobelt, non Nevill, Hainan Island, Kwangtung
lecythis crassior Annandale 1924—Western Yunnan
C. haasi (Prashad 1928)
Syn. *longispira* Heude, non Smith, Chen-tuh, Szechwan
C. ussuriensis (Gerstfeldt 1859)—Lower Amur river
C. lapidea (Heude 1890)—Chien-tuh, Anhwei
C. delavayana (Heude 1889)—Ta-li-fu, Yunnan
C. latissima (Dautzenberg et Fischer 1905)—Mongtze, Yunnan

Genus ANGULYAGRA Rao, 1931, Rec. Ind. Mus., 33, p. 301. Genotype: *Paludina oxytropis* Benson.

This genus was proposed by Rao in 1925 as *Dactylochlamys* (non Lauterborn 1901) and renamed by him in 1931 as above. The shell is of moderate size, conical, thin, and bearing spiral ridges. The generic characters were well noted by Rao (Rec. Ind. Mus., 27, p. 132). The species found in China are as follows:

Angulyagra costata (Quoy et Gaimard 1832)—Canton, Kwangtung
A. thersites (Reeve 1863)—Canton, Kwangtung
A. oxytropoides (Heude 1889)—Chao-tung Lake, Yunnan
A. polyzonata (Frauenfeld 1862)—(Canton), China
A. quangdungensis (Kobelt 1907) Kwangtung
A. annulata (Yen 1939)—Hunan

Genus MARGARYA Nevill, 1877, Jour. Asiat. Soc. Bengal, 46 (2), p. 30. Genotype: *Margarya melanoides* Nevill.

This genus is so far only known from western part of Yunnan province, a few subspecies or varieties, differentiated by the sculpture, have been recognized by the authors being as follows:

Margarya melanoides Nevill 1877—Ta-li Lake, Yunnan
Syn. *tuberculata* Neumayr 1887—Ta-li-lake, Yunnan
delavayi Mabille 1886—Ta-li Lake, Yunnan
M. m. carinata (Neumayr 1883)—Ta-li Lake, Yunnan
M. m. francheti (Mabille 1886)—Ta-li Lake, Yunnan
Syn. *rotundata* Neumayr 1887—Ta-li Lake, Yunnan
M. m. tropidophora (Mabille 1886)—Ta-li Lake, Yunnan
M. m. mansuyi Dautzenberg et Fischer 1905—Mongtze, Yunnan
M. m. monodi Dautzenberg et Fischer 1905—Koui-an, Yunnan
M. m. obsoleta Dautzenberg et Fischer 1905—Mongtze, Yunnan

Genus MEKONGIA Crosse et Fischer, 1876, Jour. de Conchy., 24, p. 316. Genotype: *Paludina jullieni* Deshayes.

Mekongia was proposed as a subgenus of *Paludina* based on the species *P. jullieni* Deshayes from Ca-Lgniou. It is characterized by its thick shell substance and heavy callus of columellar margin; the outer lip, however thick, seems to be somewhat retreating and aperture more or less contracted. On account of the thick callous margin of columella, I include herewith two species which bear spiral ridges. By examining the species available, I consider the genus as related to the Indian *Taia* on one hand and the Chinese *Rivularia* on the other.

Mekongia magnaciana (Heude 1889)—Chungking, Szechwan.
M. rusiostoma (Gredler 1885)—Chin-chi, Kwei-chow
M. liuiana (Yen 1937)—Anhwa, Hunan
M. hunanensis Yen 1942—Hunan
M. boettgeri (Kobelt 1907)—non Heude 1890—Hainan Island, Kwangtung
M. wilhelmi (Yen 1939)—Canton, Kwangtung
M. subcostata (Gray 1834)—China
M. rivularis (Kobelt 1907)—Hunan

Genus RIVULARIA Heude, 1890, Mémoires, p. 179. Genotype: *Paludina auriculata* Martens.

This genus has been so far known from Siang river of Hunan and its neighbouring provinces Kweichow, Kiangse, Hupei and Anhwei.

Rivularia auriculata (Martens 1875)—Siang river, Hunan
R. elongata Heude 1890—Tsi-yang river, Hunan
R. calcarata Kobelt 1907—Pao-ching, Hunan
R. bicarinata Kobelt 1907—Hunan
R. ibex Gredler 1894—Hunan
R. ovum Heude 1890—Hunan and Kweichow provinces
R. globosa Heude 1890—Hung river, Hunan
R. porcellanea Kobelt 1907—Ichang, Hupei
R. glandina Heude 1890—Pao-yang Lake, Kiangse
R. subelliptica Heude 1890—Ningkuo-hsien, Anhwei

BIBLIOGRAPHY: For further literature on Viviparidae prior to 1928, refer to Prashad's work in 1928.

CHANG, MING-CHUEN, The Anatomy of the Fresh Water Viviparous Snails, Bull. Peking Soc. Nat. Hist., III (4), pp. 45–55, 2 pls., 1929.

HAAS, FRITZ, Malacological Notes, Zool. Ser., Field Mus. Nat. Hist., 24 (8), pp. 93–96, text-fig., 1939.

KURODA, T., Notes on the Nomenclature of the Japanese Species of the Genus *Viviparus*, The Venus, I (3), pp. 98–102, 1929.

LI, FU-CHING, Anatomy von *Paludina*, Chinese Jour. Zool., I, pp. 1–10, 7 pls., 1935.

PRASHAD, B., Recent and Fossil Viviparidae, Mem. Ind. Mus., VIII (4), pp. 135–251, 1 pl., 1928.

RAO, H. SRINIVASA, *Angulyagra oxytropis* (Benson), Rec. Ind. Mus., 33 (3), p. 301.

ROHRBACH, F., Oekologische und morphologische Untersuchungen an *Viviparus* (*Bellamya*) *capillatus* Frauenfeld und *Viviparus* (*Bellamya*) *unicolor* Olivier, unter Berücksichtigung anderer tropischer Formen und im Hinblick auf phyletische Bezieh-

ungen, Archiv für Mollusk., 69 (5/6), S. 177–216, mit 20 Abbild., 1937.
Taki, I., Mollusca of Jehol, Rep. 1st. Sc. Exped. to "Manchoukou," V, 1, 1 (4), pp. 140–159, with pls., 1936.
Thiele, Johannes, Handbuch der systematischen Weichtierkunde, Erster Teil, 1929.
Yen, Teng-Chien, Die chinesischen Land- und Süsswasser-Gastropoden des Natur-Museum Senckenberg, Abhandl. senck. Naturf. Ges., 444, S. 1–233, 16 Taf., 1939.
———— A Review of Chinese Gastropods in the British Museum, Proc. Malac. Soc. Lond., 24 (5/6), pp. 170–288, 17 pls., 1942.

DISTRIBUTION OF FRESH-WATER GASTROPODS IN RELATION TO TOTAL ALKALINITY OF STREAMS

By C. S. SHOUP[1]

During four summers (1938–1941) the biological survey parties of the Tennessee Division of Game and Fish have collected specimens of aquatic mollusks as a part of the fisheries survey work. Lists of some of the species taken have already been published, (Shoup and Peyton, 1940; Shoup, Peyton and Gentry, 1941) and Mr. Calvin Goodrich, who kindly identified the specimens, has already reported (1940) on the sequence of distribution of our species from the Obey River drainage of Tennessee.

At the present time 47 of the most abundant species of gastropods have been obtained from 156 localities out of a total of 420 different collecting stations in the minor watersheds of the principal drainages of the state. Most tributaries from which collections have been taken, particularly in the basin of the Big South Fork of the Cumberland, the Obey River, and nearly the whole of the Tennessee drainage in East Tennessee, flow over bedrock characteristic of a particular geological formation, and in many instances discernible differences in total alkalinity, usually as bicarbonate (acid carbonate) alkalinity, can be definitely assigned to the presence of a particular bedrock stratum characteristic of the individual stream. We have been interested in this geochemistry of the natural waters, and I have attempted to

[1] Department of Biology, Vanderbilt University.

show here our findings regarding distribution of various species of snails in waters of definite degrees of total alkalinity, and what we have discovered thus far regarding the apparent productivity in terms of frequency of snail collections in the numerous stations of different alkalinity limits.

It has generally been assumed that with aquatic mollusks carbonate and bicarbonate in solution in fresh waters produce a more favorable environment than very soft waters having no appreciable hardness. This has been partially indicated by Adams (1915, p. 47) and by Boycott (1936, p. 148), but as the latter author indicates, the great trouble is to disentangle the importance of quality of water from geographical distribution, the physical characters of the habitat, and available food materials as factors promoting abundance of a species at any locality. I have not considered, in our tabulation of distribution, the abundance of a species, but rather the presence of particular species. For the most part, the more alkaline streams yielded greater volume of collections of each species present. The final effect of ecological factors is their sum and the beneficial effect of calcium in many localities may be overridden by other unfavorable circumstances. Nevertheless, if enough collecting is carried out in sufficient numbers of localities, with simultaneous determination of hardness or total alkalinity, one should obtain some kind of picture of distribution of species in the soft-water and hard-water streams.

Few reports on collections give chemical characteristics of natural waters at the time the collections were made. The New Hampshire stream survey reports (Hoover, 1938; Warfel, 1939) show *Campeloma*, *Physa*, *Lymnaea*, and *Helisoma* have been obtained from the very soft waters of that region, while in New York (1936) *Campeloma decisum* and *Pleurocera acuta* appear in waters of moderate alkalinity. On the basis of our present records of the chemistry of natural waters in Tennessee, I cannot see any disagreement in our tabulation of species distributed in various alkalinity ranges with those previously reported by Goodrich (1928, 1934, 1935, 1937, 1938) for Tennessee.

Table I indicates distribution of our collections in relation to total alkalinity as determined by methyl-orange titration at the time of collection and at the site of collection. This shows, ac-

TABLE 1. Range of distribution of species in waters of total alkalinity as shown in parts per million $CaCO_3$.

Goniobasis clavaeformis	5–220
Goniobasis proxima	6– 8
Goniobasis emeryensis	7– 12
Campeloma decisum	7–135
Goniobasis gerhardtii	9– 13
Campeloma lewisii	10– 20
Helisoma anceps	11– 35
Pleurocera curtum	17– 19
Goniobasis interrupta	17– 25
Pleurocera modestum	17– 50
Pleurocera parvum	17– 85
Anculosa subglobosa	17–165
Goniobasis laqueata	17–179
Physa microstoma	21–180
Lithasia verrucosa	22– 25
Lymnaea columella	22– 34
Physa gyrina	22– 34
Pleurocera canaliculatum undulatum	24–198
Goniobasis angulata	35–165
Physa pomila	41– 45
Pleurocera canaliculatum filum	55– 75
Anculosa praerosa	56–198
Lithasia geniculata pinguis	60– 65
Pleurocera alveare	63–117
Lithasia armigera	63–113
Lithasia geniculata	63– 90
Campeloma ponderosum	63– 70
Somatogyrus depressum	70– 75
Goniobasis ebenum	70–100
Lithasia obovata	80–161
Lithasia armigera stygia	89– 92
Lithasia geniculata venusta	89–106
Lithasia obovata f. depygis	89– 93
Lithasia obovata sordida	99–145
Lymnaea obrussa	100–125
Goniobasis carinifera	105–110
Pleurocera striatum	110–115
Goniobasis teres	113–115
Pleurocera walkeri	116–118
Pleurocera nobile	116–120
Pleurocera unciale	116–220
Anculosa umbilicata	130–135
Goniobasis plicatostriata	134–199

TABLE 1.—(*Continued*)

Goniobasis acutocarinata	139–142
Goniobasis arachnoidea	160–164
Lymnaea humilis modicella	178–182
Physa integra	208–220

cording to our present records, that there may be a tendency for certain species to be restricted to hard or soft waters, while others are well-distributed chemically, but locally restricted in certain drainage areas. Of the Pleuroceridae, *Goniobasis laqueata* and *G. clavaeformis*, for example, are found in a wide range of total alkalinity, but separated in distribution; the former being taken by us mainly in the Ordovician streams of Middle Tennessee, and the latter from the upstream drainage of the Tennessee River in East Tennessee. Many more upland streams with extremely soft water were examined than those with considerable bicarbonate or even normal carbonate in solution. Some of the torrential non-calcareous streams could be discounted as productive on the basis of physical factors, but so many were of suitable ecology with a fair bottom fauna other than snails that the value of only 10.2 percent (Table 2) quite indicates the low productivity of streams below 20 parts per million of bicarbonate.

Certain soft-water streams of the Cumberland Plateau are as low as 2–6 parts per million bicarbonate, flowing in the sandstones

TABLE 2. Distribution of Collections in relation to Total Alkalinity.

Range of Total (M.O.) Alkalinity p.p.m.	No. of Collection Stations	No. of Stations yielding snails	Percentage of productive Stations	Collecting Stations of carbonate (CO_3) alkalinity
0– 20	175	18	10.2	0
20– 40	41	18	43.6	1
40– 60	22	12	54.5	0
60– 80	18	10	55.5	0
80–100	22	15	68.0	4
100–120	33	19	57.5	9
120–140	46	21	45.5	8
140–160	26	19	73.0	3
160–180	16	12	75.0	1
180–220	21	12	57.0	3

and shales of the Pennsylvanian (Lee formation), with no available calcium for shell-building. Such waters were found to be very unproductive. At the other extreme of hardness of 160–220 parts per million total alkalinity, sluggish lowland streams which otherwise might be most productive of snails may be made adverse by intermittent flooding and by movement of deposits of erosion silt, since for the most part their flow is through cultivated land.

It would be of interest to study further this possible relation of species distribution to water hardness in other regions. Possibly this field evidence of the influence of total alkalinity can supplement experimental studies on the quantity of bicarbonate or carbonate necessary for growth and shell building.

Literature Cited

Adams, C. C., 1915, Mem. Natl. Acad. Sci. 12 (2): 1–184.

Boycott, A. E., 1936, Jour. Animal Ecology 5 (1): 116–186. May.

Goodrich, Calvin, 1928, Occ. Papers, Mus. of Zool., Univ. of Mich., No. 192: 1–18.

Goodrich, Calvin, 1934–1938, Occ. Papers, Mus. of Zool., Univ. of Mich. I, No. 286, 1934; V, No. 318, 1935; VI, No. 347, 1937; VII, No. 376, 1938.

Goodrich, Calvin, 1940, Nautilus 53: 73–79. Jan.

Hoover, E. E., et al., 1938, N. H. Game and Fish Dept., Concord, Report No. 3: pp. 1–238.

New York, State of, 1936, Suppl., 26th annual report. Biol. Survey. No. XI: pp. 1–373.

Shoup, C. S., and J. H. Peyton, 1940, Report, Reelfoot Lake Biol. Sta. Vol. 4, Misc. Publ., Tenn. Div. of Game and Fish, Nashville, No. 2: pp. 106–116.

Shoup, C. S., J. H. Peyton and Glenn Gentry, 1941, Report, Reelfoot Lake Biol. Sta. Vol. 5, Misc. Publ., Tenn. Div. of Game and Fish, Nashville, No. 3: pp. 48–76.

Warfel, H. E., et al., 1939, N. H. Game and Fish Dept., Concord, Report No. 4: pp. 1–256.

TWO NEW SUBGENERIC NAMES IN POTERIA

By H. BURRINGTON BAKER

For the reasons outlined below, **Bartschivindex** type *Poteria varians* (C. B. Adams),[4] is proposed for a fairly distinct Jamaican section of *Poteria* s.s. Dr. Paul Bartsch (p. 82) [12] has described and exquisitely figured a rather distinctive operculum of the section, but, as stated in 1934,[11] the successive whorls of the calcareous lamella do not always touch or even overlap, so that the group is not sharply demarcated from either *Cyclocaymania* or *Cyclobakeria*. Similarly, in the subgenus *Neocyclotus*, **Pseudaperostoma** type *Poteria inca* (d'Orbigny) [13] from east lowland Bolivia, is proposed for the mainland section, which I defined in 1923.[19]

For *Bartschivindex*, Bartsch used *Ptychocochlis* Simpson,[9] but that name was proposed as a substitute for *Platystoma* "Klein" Fischer,[7] and Simpson stated that it was "typified by *Neocyclotus jamaicensis* Chemnitz (Miss. Sci. au Mex. 7th part, p. 149)." At the place [8] cited by Simpson, Fischer et Crosse accepted *Platystoma* Klein, "of which Chemnitz has described the type under the name of *Turbo jamaicensis;* [0] its very peculiar operculum is distinguished by its numerous (6 or 7) whorls, notably concave and with margins raised and slightly reflected" (translation). The preceding might include more than one species, but the description of the operculum was taken from Pfeiffer's [6] for "*Cyclotus jamaicensis* (*Turbo*) Chemnitz." So, *Turbo jamaicensis* (Chemnitz) Wood [1] was more definitely designated as the type of *Ptychocochlis* in 1922 [11] (Cf. Pilsbry & Brown),[10] which made it an absolute synonym of *Poteria* Gray.[5] But, since Bartsch has incompletely quoted Simpson's designation, overlooked mine and seems to have copied Pilsbry and Brown's [10] identification of Chemnitz's figures, a discussion of this tangled, purely legal question may be worth the trouble.

POTERIA JAMAICENSIS (Wood).

Although Chemnitz [0] often has been cited as (preferably in parentheses or quotation marks), and actually is the real authority

[4] Bibliographic notes arranged under species and genus headings.

[0] Turbo jamaicensis, etc. Chemnitz, 1795, Conch. Cab. 11: 277, pl. 209, figs. 2057, 2058, non-binomial; not used as binomial by Dillwyn, 1817, Desc. Cat. II: 889, but simply quoted, with a query, in synonymy; contrast Pfeiffer (1846).

for many specific terms, he unfortunately cannot be quoted as the legal author of any species, because he was not a binomial writer, and has no status in nomenclature. As all students between 1828 and 1910 agreed, his Turbo jamaicensis, etc. obviously was founded on both the *lineata* and corrugate [2] forms of *P. jamaicensis* (Wood), because: 1. He stated that the whorls, so far as seen above the suture, were lightly plicate or even corrugate (figured). 2. He said that the round shelly operculum was circled (circinato?) and cut by concentric channels, which is quite the way that of Wood's species looks to the naked eye (Cf. Fischer).[7] 3. If not purely imaginary, the operculum in his fig. 2058, which shows even rapider whorl-increase than in *P. jamaicensis*, either was viewed by the artist from its inner (horny) surface or was drawn in from some sinistral species, since its sutural spiral is reversed. 4. The first description of any operculum of *Bartschivindex* was that of C. B. Adams,[4] half a century later.

The legal author, that is, the first legal reference for *Turbo jamaicensis* is apparently W. Wood,[1] who also used it, without citation of Chemnitz or Gray, in "*Cyclostoma* Lamarck." Unless definitely refutable, all subsequent usages [9] legally are correct or

---

[1] *Turbo jamaicensis* Wood, 1828, Index test., ed. 2, Suppl.: 18, pl. 6, *Turbo*, fig. 3; *Cyclostoma jamaicense*, p. 36; neither Chemnitz nor Gray cited. [2] *C. corrugatum* Menke, 1829, Verz. Conch. Samml. Malsburg: 10; 1830, Syn. meth. Moll.: 39; probably nude, since a misspelled abbreviation of a polynomial, without "bibliographic reference," is scarcely a "definite citation of an earlier name" (see Opinion 1); but vested in synonymy by Pfeiffer (1846); shell (minus operculum) figured by Chemnitz now designated type; not of Sowerby (1843). [3] *C. j.* Gray in Wood, Sowerby, 1843, Thes. Conch. 1: 96, pl. 23, figs. 12, 13, with Chemnitz in synonymy. *C. j.* Chemnitz, Pfeiffer, 1846, Conch. Cab.: 16, minus operculum; [4] C. B. Adams, 1850, Contr. Conch. 8: 143; 1852, Ann. Lyc. New York 5: 59. *Aperostoma j.* Chemn., Pfr., 1847, see note 14. [5] *Cyclotus j.* (Gray), Gray, 1850, Nomencl. moll. an. Brit. Mus. 1: 11, in main part; *Poteria* also validated. [6] *C. j.* Chemn., Pfr., 1852, Mon. pneumon. viv.: 25, with *T. j.* Wood (1828) in synonymy. *Platystoma j.* Chemnitz, [7] Fischer, 1885, Man. Conch.: 744; not *P.* Mörch (1852), etc.; Platystoma Klein (1753) was prebinomial and could not be "several times preoccupied"; [8] F. & C., 1888, Rech. Zool. (7) 2: 149–150; described operculum now selected as type. *Neocyclotus j.* Chemn., [9] Simpson, 1895, Proc. U. S. Nat. Mus. 17: 431. *A. j.* (Sowerby), [10] Pilsbry and Brown, 1910, Proc. Acad. Nat. Sci. Philadelphia 62: 533–4. *Poteria j.* (Wood), [11] H. B. B., 1922, Nautilus 36: 15; 1934–5, Naut. 48: 66, 86. *P. j.* (Gray), etc., Bartsch, [12] 1942, Bull. U. S. Nat. Mus. 181: 105–112.

incorrect identifications and revisions or clarifications of Wood's species. Although, as Pilsbry and Brown [10] remarked, Wood's figure, without operculum, "defies identification," Sowerby [3] has figured the operculum of an apparently rougher and brighter shell, and made this variable species recognizable. However, since Gray [5] named Sowerby's figures *Cyclotus lineatus* and included Wood and Chemnitz in the synonymy of "*C. jamaicensis* (Gray)," Wood's poorly drawn type shell, which apparently came from the British Museum, may have been a corrugate example.

Pseudaperostoma vs. Aperostoma.

For *Pseudaperostoma*, Bartsch (p. 124) [12] used *Aperostoma* Troschel,[14] but apparently forgot that the old (1901) method of genus division by "restriction" was eliminated in the new (1907) article 30 of the international rules, which explicitly defined "type designation." Anyway, he evidently overlooked the truth that Pfeiffer,[14] who in Bartsch's claims "restricted" Troschel's group to *Poteria blanchetiana* without mention of either species, was still including *A. mexicanum* in *Aperostoma* four months later; [14] was still retaining both species in his equivalent group (*Cyclotus*) in 1852; [16] first transferred *A. mexicanum* to a separate genus (*Cyclophorus*) in 1858; [17] and even then did not see the operculum of the typical form. For these reasons, Herrmannsen's earlier (1852) [15] designation of *A. mexicanum* as type unfortunately cannot be circumvented; the "Genus *Cyrtotoma* Mörch" (p. 169) [12] remains an absolute synonym of *Aperostoma* Troschel; Aperostomatinae (1922) [11] or Poteriinae Thiele (1929) supersedes "Aperostominae, new subfamily" (1942); and *Neocyclotus* Fischer et Crosse (1888!), which includes *Poteria inca* (+ *P. blanchetiana?*),[16] continues to be the correct name for the "Genus *Aperostoma*" Bartsch.

[13] 1835, Magasin Zool. 5, Syn. moll. Am. mérid.: 29. [14] 1847, Zeitschr. Malak. 4: *Aperostoma* Troschel, p. 44 (March no.), included *Cyclostoma volvulus*, *C. mexicanum*, *C. blanchetianum* "und viele andere"; Pfeiffer, pp. 47 (March) and 104 (July), removed *Cyclophorus volvulus* and added others; Cf. Sykes, 1901, Jour. Malac. 8: 107–8. Petit, 1850, Jour. de Conch. 1: 38, selected no type but simply quoted Pfeiffer's (1847: 104) groups §1 and §2 with, as "typ. [icae, -is or -i?]" of them, two "Species which the author of the genus doubtfully referred to it" (Article 30). [15] Indicis gener. Suppl.: 10, first type designation (*C. mexicana*). [16] Mon. pneum. viv.: 19, 34. [17] Suppl. 1: 55. [18] Biologia C. A.: 3. [19] Occ. Papers Mus. Zool. Univ. Mich. 137: 30, 39–46.

Incidentally, although von Martens (1890) [18] revived *Aperostoma* so as to replace *Neocyclotus*, apparently Sykes (1901) [14] was the first to propose that "we regard *blanchetianum* (= *inca*) as the type," according to the code adopted that year, but changed in 1907. So, let us follow his good example, and take the dumb rules as they come.

NOTES ON THE SEX RATIOS IN CAMPELOMA

By LESLIE HUBRICHT

Several years ago, I collected a large number of *Campeloma* from the Meramec River, at Kirkwood, St. Louis County, Missouri and introduced them (apparently unsuccessfully) into an artificial lake in Fairgrounds Park, St. Louis. Since I had been told that males were rare in this genus, I placed them in an aquarium before making the introduction and as they crawled about I sorted out the males by the enlarged right tentacle. Much to my surprise, I found that there were about two males to three females.

Since then whenever I cleaned a collection of this genus, I have noted the sex and have marked it on the shell. In the following table are listed all the lots in my collection in which the sexes were thus noted.

At Kirkwood, every specimen over one-fourth inch in diameter was collected so that the ratio is not influenced by that natural human tendency to pick the biggest, which influenced the ratios of some of the other lots. The shells of mature females have about twice the volume of those of mature males.

From the following table, the sex ratios in *Campeloma*, in the Midwest at least, are apparently similar to those found in *Viviparus* by Van Cleave and Lederer (Jour. Morph. 53: 499–522, 1932), who concluded that the two sexes were born in equal numbers but because of the longer life span of the females they were apt to exceed the males by a ratio of as much as two or three to one. However, some of the above lots do not contain males altho the samples are large enough so that they should have been collected had they been present. In these lots, the shells are thin and depauperate and, under adverse conditions, parthenogenetic races probably have developed.

Locality	males	females	% males
Wabash R., Terre Haute, Ind.	0	18	00
Belmont Harbor, Chicago, Ill.	0	18	00
creek, Koster, Ill.	0	7	00
Kankakee R., Momence, Ill.	0	13	00
Illinois R., Hardin, Ill.	10	50	16.6
Mississippi R., Hamburg, Ill.	12	48	20
Mississippi R., Alton, Ill.	1	6	14.3
Kaskaskia R., Baldwin, Ill.	60	153	28.2
Kaskaskia R., Evensville, Ill.	5	3	62.5
Beaucoup Cr., Murphysboro, Ill.	17	28	27.7
Big Muddy R., Murphysboro, Ill.	17	45	27.4
Big Muddy R., Aldridge, Ill.	7	9	43.7
Loutre R., Big Spring, Mo.	0	20	00
Meramec R., Mattese, Mo.	13	46	22
Meramec R., Kirkwood, Mo.	553	749	42.5
Meramec R., Morschels, Mo.	3	16	15.8
Meramec R., Eureka, Mo.	3	6	33.3
Meramec R., Hunters Ford, Mo.	12	3	80
Meramec R., Catawissa, Mo.	6	9	40
Meramec R., Stanton, Mo.	14	26	35
Bourbeuse R., Pin Oak Ford, Mo.	26	23	53
Bourbeuse R., Union, Mo.	8	20	28.6
Whitewater R., Burfordville, Mo.	16	5	76.2
White R., Calico Rock, Ark.	2	4	33.3
Alabama R., Selma, Ala.	1	2	33.3
Total	786	1327	37.2

MARINE MOLLUSCA OF NEW YORK CITY

By MORRIS K. JACOBSON

It is now more than twenty years since a listing of marine mollusks of the New York City area was undertaken by Mr. Arthur Jacot (*Nautilus* 32: 90–94, 33: 111–115, 34: 59–60). For the past two or three years the present author has been going over much the same ground, concentrating on the Rockaway Peninsula, stations 4 and 5 in Mr. Jacot's article (ib. 32: 91). It might be of interest to see in what respects a more recent list differs from the older.

Before beginning, it is proposed to add to Mr. Jacot's five stations two more, namely, station 6 just east of the Marine Parkway Bridge on the Rockaway shore of Jamaica Bay, where the receding tide exposes some hundred feet of sand and mud and

rocks; and station 7 at 117 Street near the Yacht Club, where *Odostomia* are found in large numbers.

The present paper will consist of three parts. First it is proposed to list species found in 1939–42 that do not appear on the Jacot list; second those species that appear on both lists; and third, species that were found only by Mr. Jacot.

SPECIES FOUND RECENTLY AND NOT MENTIONED BY MR. JACOT.

Nucula proxima Say. One valve on dredged land at 6.

Noetia ponderosa Say. Mr. Jacot reported three valves from Long Beach, but I have found them in moderately large numbers at 4 and 5. Since they are generally conceded to be fossil, it is possible that recent erosion of undersea beds has made them more plentiful.

Cyprina islandica Linne. Two valves at 4. *Astarte undata* Gould. Seven valves at 4.

Venericardia tridentata Say?. Of this species, apparently far out of its given range, Mr. Richard A. McLean of the Academy of Natural Sciences of Philadelphia says in a letter to the author (Nov. 17, 1941): "The small *Venericardia* is very like *V. tridentata* Say, but does not seem to match exactly. We have similar specimens in our own collection from Delaware Bay. They look like yours and are marked *tridentata* with a question mark after it. Perhaps they are an undescribed species, but I would hesitate to describe them without a very thorough search of the literature."

Laevicardium mortoni Conrad. Single valves not uncommon at 4.

Donax fossor Say. Very common during the summer months of 1938 and 1939 at 4. Since then rare, completely lacking in 1942. Color variation in the shell interior is pronounced, from white to deep purple. There is also a color series tinged with yellow.

Saxicava arctica Linne. One valve at 6.

Barnea costata Linne. Several fragments at 4. This species is reported from New York by S. Smith, *Catalogue of the Mollusca of Staten Island* (Natural Science Association, Proc., Vol. I, p. 35 and p. 50) but Mr. Jacot says: "I do not know of their having been reported (since) from the vicinity of the city." (*Naut.* 32: 114). The present listing then reestablishes them as a New York species. The same statements apply to *Littorina irrorata*, *Natica*

pusilla, and *Nassarius vibex* (see below), but not to *Haminoea solitaria*, which I have found at Centerport, Long Island, but not nearer.

Circulus (*Lydiphnis*) *liratus* Verrill. This is probably a new locality record for this species, which C. W. Johnson records only from Cape Hatteras.

Stylifer stimpsoni Verrill, two specimens at station 4. *Epitonium angulatum* Say, several at 4. *Epitonium humphreysii* Kiener, several at 4. *Turbonilla winkleyi* Bartsch, several at 4. *Natica pusilla* Say, three specimens at 4 (Cf *Barnea costata* above). *Crucibulum striatum* Say, four specimens at 4. *Hydrobia salsa* Pilsbry, several specimens at 6. *Onoba aculeus* Gould, several specimens at 6. *Littorina irrorata* Say, not rare at 4 (Cf *Barnea costata* above). *Scila adamsii* H. C. Lea, one specimen at 4. *Nassarius vibex* Say, four specimens at 4 (Cf *Barnea costata* above).

Buccinum undatum Linné. Jacot reports one with much surprise (*Naut.* 34: 60), but worn specimens, bearing marks of having been occupied by *Pagurus*, are not uncommon. Egg cases containing prenatal forms are occasionally found.

Colus stimpsoni Mörch. Eight specimens found at 4, all bearing marks of having served as a dwelling for *Pagurus*.

Busycon carica Gmelin. Not uncommon generally. Omission of this far from rare species from Mr. Jacot's list is surprising.

Mangelia cerina Kurtz and stimpson. Two specimens at 4.

Species appearing on both lists.

The names used by Mr. Jacot have been changed, where necessary, to conform to C. W. Johnson's *List of Marine Molluscs etc.* (Boston 1934.) I have also adopted Dr. Johnson's method of omitting parentheses around authors' names.

Arca campechiensis pexata Say. *Arca transversa* Say. *Ostrea virginica* Gmelin. *Pecten irradians* Lamarck.

Pecten grandis Solander. Mr. Jacot found 16 specimens containing the animal beside a number of valves after a great storm at 4 (*Naut.* 34: 60). I have never been so fortunate, though I have occasionally found worn valves.

Anomia simplex Orbigny. *Mytilus edulis* Linne. *Mytilus edulis pellucidus* Pennant. *Modiolus demissus plicatulus* Lamarck, common in Jamaica Bay. *Periploma leanum* Conrad, at Far Rockaway, on the bay shore.

Pandora gouldiana Dall. Mr. Jacot found only one valve at 1. It is however not at all uncommon at 4 and 5.

Astarte castanea Say. This was the only "species of note" Mr. Jacot found at 4.

Venericardia borealis Conrad, several specimens at 4. *Divaricella quadrisulcata* Orbigny; frequent at 4 and 5; specimens frequently look very fresh.

Rochefortia planulata Stimpson. Quite common in 1941 and 1942 clinging to red sea weeds and, apparently by preference, to bryozoa. The animal attaches itself by a clear, elastic, single threaded byssus which it extrudes from the center of the ventra margin.

Callocardia morrhuana 'Linsley' Gould; not rare at 4; live specimens occasionally found in winter months. *Venus mercenaria* Linne, not common at 4 and 5. *Venus mercenaria notata* Say, difficult to be sure of identification of worn valves. *Gemma gemma* Totten.

Petricola pholadiformis Lamarck. I have frequently found young of this species caught by the byssus of *Mytilus edulis*. These forms are usually much distorted and nearly deprived of their corrugations, but otherwise seem not to have suffered from their captivity. The peculiar color manifestation which Mr. Robert C. Alexander noted in specimens collected at Cape May, and felt "may be an artificial condition caused by an excess of some chemical in the sea or the land of the locality," (*Naut.* 54: 4), is also present in many immature forms here. This color was also noted by Dall on Pacific coast Petricolas in 1900 (*Naut.* 13: 9) where he described it as follows: ". . . variously mottled and tinted with purple or reddish brown and yellow." Dall decided this was a common condition of nepionic forms of *Petricola tellimyalis* Carpenter (ib. 13: 11).

Tellina tenera Say; especially fine and large specimens were plentiful in 1941 and 1942 at 4. *Tellina tenella* Verrill, occasionally at 4. *Tagelus gibbus* Spengler. *Siliqua costata* Say, fragments at 4. *Spissula solidissima* Dillwyn. *Spissula solidissima similis* Say, more common at 5. *Mulinia lateralis* Linne, also at 6. *Mya arenaria* Linne, most common at 7. *Corbula contracta* Say, also at 4.

Barnea truncata Say. Most common at 5. Live specimens occasionally found at 4 in water logged wood.

Zirfaea crispata Linne. Somewhat less common than the preceding. In smaller wood fragments, *Barnea* and *Zirfaea* are never found together.

Teredo navalis Linne, common in driftwood at 4.

Epitonium multistriatum Say, Five small specimens at 4. *Pyramidella fusca* C. B. Adams, several specimens at 6. *Odostomia impressa* Say, one specimen at 6. *Odostomia trifida* Totten, common at 7. *Odostomia bisuturalis* Say, a few specimens at 6. *Polinices duplicata* Say. *Polinices heros* Say. *Polinices triseriata* Say. *Crepidula fornicata* Linne. *Crepidula glauca convexa* Say. *Crepidula plana* Say. *Paludestrina minuta* Totten, not uncommon at 4 and 6. *Littorina littorea* Linne, also at 6 and 7. *Littorina saxatilis* Olivi, has become quite common in Jamaica Bay. *Littorina palliata* Say, occasionally small specimens at 4. *Lacuna vincta* Montagu, common in Summer of 1941 at 4. *Triphora perversa nigrocincta* C. B. Adams, not uncommon at 4. *Cerithiopsis greenii* C. B. Adams, not uncommon at 4. *Bittium alternatum* Say; common at 4, immature forms especially so. *Eupleura caudata* Say. *Urosalpinx cinerea* Say.

Mitrella lunata Say. Common in 1939 and 1940 on sea weeds, bryozoa etc. A very lively creature which can float *Physa*-like on the under surface of still water.

Anachis avara similis Ravenel, one specimen at 4. *Nassarius obsoleta* Say. *Nassarius trivittata* Say. *Busycon canaliculatum* Say. *Cylichna oryza* Totten, not uncommon at 4. *Acteon punctostriatus* C. B. Adams, three specimens at 4. *Acteocina canaliculata* Say, common at 4, when conditions are right. *Melampus lineatus* Say. *Alexia myosotis* Draparnaud, one specimen at 4.

SPECIES NOT FOUND OR NOT IDENTIFIED BY PRESENT AUTHOR WHICH APPEAR ON MR. JACOT'S LIST.

Nucula proxima truncula Dall. *Yoldia sp?*

Lyonsia hyalina Conrad. Station 1, where this species was found by Mr. Jacot, has not been revisited as yet.

Aligena elevata Stimpson.

Cardium pinnulatum Conrad. It is surprising that one valve of this rare species was reported and no sign of the rather common *Laevicardium mortoni.*

Gemma purpurea H. C. Lea. *Tellina versicolor* Cozzens. *Macoma balthica* Linne. *Dentalium sp. Pyramidella winkleyi* Bartsch?

Turbonilla nivea Stimpson. More or less severely damaged turbonillas are quite common at 4, but their condition and the natural difficulty of this group make reliable identification exceedingly difficult. Possibly this and the following turbonillas are represented in this group.

Turbonilla aequalis Say. *Turbonilla vinea* Bartsch. *Turbonilla areolata* Verrill. *Crepidula glauca* Say. *Paludestrina laevis* DeKay. *Adeorbis supranitidus lirata* Verrill (= *Circulus liratus* Verrill??).

NOTES AND NEWS

An Interesting Cache.—The National Museum has just received a very interesting collection of Naiads collected by Dr. L. W. Stephenson and Mr. Marc O. Miller in the Brazos River, upstream from Black Bridge, 15.5 miles northeast of Cameron, Milam County, Texas. These fresh-water clams came from "one pot hole in a sandstone concretion. This pot hole was about 12 inches in diameter and 15 inches deep. The shells were in a mixture of loose sand and pebbles." They were probably washed in by the stream in flood time. Dr. Stephenson tells me that the pot hole was dry in the dry season. The collection embraces 7 species as follows: *Amblema perplicata* (Conrad), 15 specimens and 6 valves. *Megalonaias gigantea* (Barnes), 2 valves. *Quadrula forsheyi* (Lea), 21 specimens and 6 valves. *Quadrula houstonensis* (Lea), 21 specimens and 4 valves. *Arcidens confragosus* (Say), 1 young specimen. *Proptera coloradoensis* (Lea), 1 young specimen. *Lampsilis fallaciosa* (Smith), 1 specimen.—Paul Bartsch.

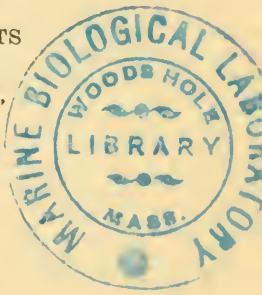
New Name in Coelocentrum.—I am indebted to Drs. Clench and Baker for bringing to my attention the preoccupation of my *Coelocentrum* (*Ptychocentrum*) *bourgeoisae* (Nautilus, vol. 56, pp. 91–92, 1943) by Dr. Pilsbry's *Coelocentrum* (*Schizopyle*) *bourgeoisae* (Nautilus, vol. 53, p. 27, 1939). I therefore take pleasure in rechristening my species *Coelocentrum* (*Ptychocentrum*) *marianum*. —Paul Bartsch.

Vol. 56 JULY, 1942 No. 1

THE NAUTILUS

A QUARTERLY
DEVOTED TO THE INTERESTS OF CONCHOLOGISTS

EDITORS AND PUBLISHERS
HENRY A. PILSBRY, Curator of the Department of Mollusca, Academy of Natural Sciences, Philadelphia
H. BURRINGTON BAKER, Professor of Zoology, University of Pennsylvania



CONTENTS

$2.00 per year ($2.15 to Foreign Countries) 50 cents a copy

HORACE B. BAKER, *Business Manager*
Zoological Laboratory, University of Pennsylvania,
38th and Woodland Avenue, Philadelphia, Pa.

Entered as Second-Class matter, October 29, 1932, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

THE NAUTILUS:

A Quarterly Journal devoted to the study of Mollusks, edited and published by HENRY A. PILSBRY and H. BURRINGTON BAKER.

Matter for publication should reach the senior editor by the first of the month preceding the month of issue (January, April, July and October). *Typescript should be double spaced.* Proofs will not be submitted to authors unless requested.

REPRINTS are furnished at printer's rates. ORDERS SHOULD BE WRITTEN ON OR ATTACHED TO FIRST PAGE OF MANUSCRIPT.

	4 pp.	*8 pp.*	*16 pp.*
50 copies	$3.70	5.40	7.60
100 copies	4.10	6.00	8.50
Additional 100s	.75	1.20	1.80

Covers: 50 for $2.50; additional covers at the rate of $1.50 per hundred.

Plates (pasted in): 65 cents for 50; $1.20 for 100.

THE NAUTILUS is the official organ of the American Malacological Union. Information regarding membership in the Union may be obtained from Mrs. Imogene C. Robertson, Financial Secretary, Buffalo Museum of Science, Buffalo, N. Y.

EXCHANGE NOTICES

WANTED: One dollar each will be paid for July, 1938, copies of THE NAUTILUS. Also WANTED: Back Volumes and Numbers of THE NAUTILUS. Especially Vols. 3, 4, 18, 20, 21, 22, 23 and 24. Address
HORACE B. BAKER, Zool. Lab. Univ. Penna.

FOR EXCHANGE: Fifteen varieties, Florida tree snails (*Liguus*) including three of the rare *solidus*, to exchange for Achatinella, Amphidromus, Bulimulus, Cochlostyla, Orthalicus, Porphyrobaphe and Placostylus. Send your list to PAUL P. MCGINTY, Boynton, Florida.

WANTED: Pupillidae preserved in alcohol for dissection.
PROF. C. M. STEENBERG, Univ. of Copenhagen, Nörregade 10, Denmark.

NEW ENGLAND Coast Shells for sale or exchange. List sent on request. List of foreign shells for sale on request.
MRS. F. K. HADLEY, 88 Oliver St., Malden, Mass.

WEST COAST SHELLS for exchange. My list sent on request.
TOM BURCH, 1611 S. Elena Ave., Redondo Beach, Calif.

Vol. 56 OCTOBER, 1942 No. 2

THE NAUTILUS

A QUARTERLY
DEVOTED TO THE INTERESTS OF CONCHOLOGISTS

EDITORS AND PUBLISHERS
HENRY A. PILSBRY, Curator of the Department of Mollusca, Academy of Natural Sciences, Philadelphia
H. BURRINGTON BAKER, Professor of Zoology, University of Pennsylvania

CONTENTS

$2.00 per year ($2.15 to Foreign Countries) 50 cents a copy

HORACE B. BAKER, *Business Manager*
Zoological Laboratory, University of Pennsylvania, 38th and Woodland Avenue, Philadelphia, Pa.

Entered as Second-Class matter, October 29, 1932, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

THE NAUTILUS:

A Quarterly Journal devoted to the study of Mollusks, edited and published by HENRY A. PILSBRY and H. BURRINGTON BAKER.

Matter for publication should reach the senior editor by the first of the month preceding the month of issue (January, April, July and October). *Typescript should be double spaced.* Proofs will not be submitted to authors unless requested.

REPRINTS are furnished at printer's rates. ORDERS SHOULD BE WRITTEN ON OR ATTACHED TO FIRST PAGE OF MANUSCRIPT.

	4 pp.	*8 pp.*	*16 pp.*
50 copies	$4.10	5.95	8.35
100 copies	4.50	6.50	9.35
Additional 100s	.85	1.30	2.00

Plates (pasted in): 70 cents for 50; $1.30 for 100.

THE NAUTILUS is the official organ of the American Malacological Union. Information regarding membership in the Union may be obtained from Mrs. Imogene C. Robertson, Financial Secretary, Buffalo Museum of Science, Buffalo, N. Y.

EXCHANGE NOTICES

Vol. 56 JANUARY, 1943 No. 3

THE NAUTILUS

A QUARTERLY
DEVOTED TO THE INTERESTS OF CONCHOLOGISTS

EDITORS AND PUBLISHERS
HENRY A. PILSBRY, Curator of the Department of Mollusca, Academy of Natural Sciences, Philadelphia
H. BURRINGTON BAKER, Professor of Zoology, University of Pennsylvania

CONTENTS

$2.00 per year ($2.15 to Foreign Countries) 50 cents a copy

HORACE B. BAKER, *Business Manager*
University of Pennsylvania, Zoological Laboratory,
38th and Woodland Avenue, Philadelphia, Pa.

Entered as Second-Class matter, October 29, 1932, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

THE NAUTILUS:

A Quarterly Journal devoted to the study of Mollusks, edited and published by HENRY A. PILSBRY and H. BURRINGTON BAKER.

Matter for publication should reach the senior editor by the first of the month preceding the month of issue (January, April, July and October). *Manuscript should be typewritten and double spaced.* Proofs will not be submitted to authors unless requested.

REPRINTS are furnished at printer's rates. ORDERS SHOULD BE WRITTEN ON OR ATTACHED TO FIRST PAGE OF MANUSCRIPT.

	4 pp.	*8 pp.*	*16 pp.*
50 copies	$2.50	$4.00	$6.50
100 copies	3.00	4.75	8.00
Additional 100s	1.00	1.50	3.00

Plates (pasted in): $2.00 for 50; additional 1.5c each

[POSTAGE EXTRA]

THE NAUTILUS is the official organ of the American Malacological Union. Information regarding membership in the Union may be obtained from Mrs. Imogene C. Robertson, Financial Secretary, Buffalo Museum of Science, Buffalo, N. Y.

EXCHANGE NOTICES

WANTED: One dollar each will be paid for July, 1938, copies of THE NAUTILUS. Also WANTED: Back Volumes and Numbers of THE NAUTILUS. Especially vol. 3, nos. 1–4, 6, 7, 9, 10; vol. 4, no. 1; vol. 6, no. 3; vol. 9, no. 1; vol. 13, no. 4; vol. 17, nos. 5, 6, 8, 10; vol. 18, nos. 3, 9, 11, 12; vol. 19, nos. 7–10; vol. 20, nos. 6–8, 12; vol. 21, all nos.; vol. 22, nos. 1, 3, 6, 9; vol. 23, no. 5; vol. 24, nos. 7, 11; or any of these volumes. Address HORACE B. BAKER, Zool. Lab., Univ. Penna.

FOR EXCHANGE: Fifteen varieties, Florida tree snails (*Liguus*) including three of the rare *L. solidus*, to exchange for Achatinella, Amphidromus, Bulimulus, Cochlostyla, Orthalicus, Porphyrobaphe and Placostylus. Send your list to PAUL P. MCGINTY, Boynton, Florida.

WANTED: Pupillidae preserved in alcohol for dissection.
PROF. C. M. STEENBERG, Univ. of Copenhagen, Nörregade 10, Denmark.

NEW ENGLAND COAST SHELLS for sale or exchange. List sent on request. List of foreign shells for sale on request.
MRS. F. K. HADLEY, 88 Oliver St., Malden, Mass.

WEST COAST SHELLS for exchange. My list sent on request.
TOM BURCH, 1611 S. Elena Ave., Redondo Beach, Calif.

Vol. 56 APRIL, 1943 No. 4

THE NAUTILUS

A QUARTERLY
DEVOTED TO THE INTERESTS OF CONCHOLOGISTS

EDITORS AND PUBLISHERS
HENRY A. PILSBRY, Curator of the Department of Mollusca,
Academy of Natural Sciences, Philadelphia
H. BURRINGTON BAKER, Professor of Zoology,
University of Pennsylvania

CONTENTS

$2.00 per year ($2.15 to Foreign Countries) 50 cents a copy

HORACE B. BAKER, *Business Manager*
University of Pennsylvania, Zoological Laboratory,
38th and Woodland Avenue, Philadelphia, Pa.

Entered as Second-Class matter, October 29, 1932, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

THE NAUTILUS:

A Quarterly Journal devoted to the study of Mollusks, edited and published by HENRY A. PILSBRY and H. BURRINGTON BAKER.

Matter for publication should reach the senior editor by the first of the month preceding the month of issue (January, April, July and October). *Manuscript should be typewritten and double spaced.* Proofs will not be submitted to authors unless requested.

REPRINTS are furnished at printer's rates. ORDERS SHOULD BE WRITTEN ON OR ATTACHED TO FIRST PAGE OF MANUSCRIPT.

	4 pp.	*8 pp.*	*16 pp.*
50 copies	$2.50	$4.00	$6.50
100 copies	3.00	4.75	8.00
Additional 100s	1.00	1.50	3.00

Plates (pasted in): $2.00 for 50; additional 1.5c each

[POSTAGE EXTRA]

THE NAUTILUS is the official organ of the American Malacological Union. Information regarding membership in the Union may be obtained from Mrs. Imogene C. Robertson, Financial Secretary, Buffalo Museum of Science, Buffalo, N. Y.

EXCHANGE NOTICES

WANTED: One dollar each will be paid for July, 1938, copies of THE NAUTILUS. Also WANTED: Back Volumes and Numbers of THE NAUTILUS. Especially vol. 3, nos. 1–4, 6, 7, 9, 10; vol. 4, no. 1; vol. 6, no. 3; vol. 9, no. 1; vol. 13, no. 4; vol. 17, nos. 5, 6, 8, 10; vol. 18, nos. 3, 9, 11, 12; vol. 19, nos. 7–10; vol. 20, nos. 6–8, 12; vol. 21, all nos.; vol. 22, nos. 1, 3, 6, 9; vol. 23, no. 5; vol. 24, nos. 7, 11; or any of these volumes. Address HORACE B. BAKER, Zool. Lab., Univ. Penna.

FOR EXCHANGE: Fifteen varieties, Florida tree snails (*Liguus*) including three of the rare *L. solidus*, to exchange for Achatinella, Amphidromus, Bulimulus, Cochlostyla, Orthalicus, Porphyrobaphe and Placostylus. Send your list to PAUL P. MCGINTY, Boynton, Florida.

WANTED: Pupillidae preserved in alcohol for dissection.
PROF. C. M. STEENBERG, Univ. of Copenhagen, Nörregade 10, Denmark.

NEW ENGLAND COAST SHELLS for sale or exchange. List sent on request. List of foreign shells for sale on request.
MRS. F. K. HADLEY, 88 Oliver St., Malden, Mass.

WEST COAST SHELLS for exchange. My list sent on request.
TOM BURCH, 1611 S. Elena Ave., Redondo Beach, Calif.